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ADDENDUM No. One (1)
to the contract documents for
ROWLAND HEIGHTS COMMUNITY CENTER
18150 PATHFINDER RD., ROWLAND HEIGHTS, 91748
BID NUMBER CDC12-028

Date of this Addendum November 19, 2012

Notice: This addendum is issued before the bid opening date to inform bidders of revisions to the Contract Documents and is hereby made a part of the Contract Documents. The following changes, additions, and/or clarifications shall be made to the specifications for the work of the above-mentioned project. In case of a conflict between specifications and this Addendum, this Addendum shall govern. All requirements contained in the Contract Documents shall apply to this Addendum, and the general character of the work called for in this Addendum shall be the same as originally set forth in the applicable portions of the Contract Documents for similar work, unless otherwise specified under this Addendum, and all incidental work necessitated by this Addendum as required to complete the work shall be included in the bid, even though not specifically mentioned in this Addendum. The balance of the contract documents shall remain unchanged.

This Notice To Bidders forms a part of the Contract Documents and clarifies certain portions of the Project Manual and Drawings.

GENERAL INFORMATION

1. Please indicate your receipt of this Addendum in the space on the Bid Form. Failure to do so is grounds for rejection of the Bid because this Addendum contains changes that are materially substantial to the Bid. Each prime bidder is responsible for distribution of information conveyed herein to its sub-bidders and suppliers.

2. **Bid date to remain December 13, 2012 at 2:00 p. m.**

3. **CHANGES TO PART B – PROJECT MANUAL DATED 10/31/12**
   Section 271010 – COMMUNICATIONS CABLING SYSTEM
   Please include the attached section.

   Section 274010 – AUDIO – VIDEO SYSTEMS
   Please include the attached section.

   Section 281010 – SECURITY SYSTEMS
   Please include the attached section.

Kindly notify your subcontractors to this effect.

If you have any questions regarding this project, please contact Ms. Vivian Saavedra at 323-260-3474 or at vivian.saavedra@lacdc.org.

Approved by:

BILL YEE, Manager Construction Management Division

END OF ADDENDUM

DIVISION 26, 27, AND 28 ELECTRICAL SPECIFICATIONS

TABLE OF CONTENTS

260501 General Electrical Requirements

260519 Low-Voltage Electrical Power Conductors and Cables

260526 Grounding and Bonding for Electrical Systems

260529 Hangers and Supports for Electrical Systems

260533 Raceway and Boxes for Electrical Systems

260543 Underground Ducts and Raceways for Electrical Systems

260553 Identification for Electrical Systems

260945 Lighting Automation System [Lutron EcoSystem]

262413 Switchboards

262416 Panelboards

262716 Electrical Cabinets and Enclosures

262726 Wiring Devices

262811 Low-Voltage Overcurrent Protective Devices

262816 Enclosed Switches and Circuit Breakers

265110 Interior Lighting

265610 Exterior Lighting

271010 Communications Cabling System

274010 Audio-Video Systems

281010 Security Systems

SECTION 271010 – COMMUNICATIONS CABLING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the structured cabling system for voice and data communications [also identified as the telecommunications system].

B. For complementing cabling systems associated with cable television [CATV], see Section 274010 Audio-Video Systems.

C. For complementing cabling systems associated with overhead paging, also see Section 274010 Audio-Video Systems.

1.2 RELATED WORK, STANDARDS, DOCUMENTS AND PUBLICATIONS

A. Codes, standards, and recommended practices shall be applicable to voice / data cabling systems and their components as specified herein:

1. American National Standards Institute (ANSI)

a. ANSI/TIA/EIA-455-as applicable for measurement and Testing of Fiber Optic Systems
b. ANSI/TIA/EIA-492-as applicable for specifications for Optical Fibers
c. ANSI/TIA/EIA-526 Standard Test Procedures for Fiber Optic Systems
d. ANSI/TIA-568-B Commercial Building Telecommunications Cabling Standards [Parts 1 and 2, including all associated Addendums]
e. ANSI/TIA-568-B.3 Optical Fiber Cable Components Standard
f. ANSI/TIA-568-C.0 Generic Telecommunications Cabling for Customer Premises
g. ANSI/TIA-568-C.1 Commercial Building Telecommunications Cabling Standard
h. ANSI/TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling Components Standards
i. ANSI-TIA-568-C.3 Optical Fiber Cabling Components Standard
j. ANSI/TIA/EIA-606-A Administration Standard for Commercial Telecommunications Infrastructure
ANSI/TIA/EIA-J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
k. ANSI/TIA-569-B Commercial Building Standard for Telecommunications Pathways and Spaces
l. ANSI/TIA-569-B Commercial Building Standard for Telecommunications Pathways and Spaces.
m. ANSI/TIA-758-A Customer-Owned Outside Plant Telecommunications Cabling Standard

2. Building Industry Consulting Service International (BICSI)

a. Telecommunications Distribution Methods Manual (TDMM)
b. Outside Plant Design Reference Manual (OSDRM)

3. Electronic Industries Alliance (EIA)

4. Federal Communications Commission (FCC)

    a. FCC Part 68

5. American Society for Testing and Materials (ASTM)

6. Insulated Cable Engineers Association (ICEA)

    a. Communications Wire and Cable for Premises Wiring.

7. International Electrotechnical Commission (IEC)

    a. IEC 61935-01 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 1: Installed Cabling
    b. IEC 61935-02 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 2: Patch Cords and Work Area Cords

8. Institute of Electrical and Electronics Engineers (IEEE)

    a. IEEE 802 Specification for Local Area Networks
    b. ANSI/IEEE C62.41 – Guide on the Surge Environment in Low-Voltage (1000V or less) AC Power Circuits

9. International Organization for Standardization (ISO)

    a. ISO/IEC 11801 Information Technology – Generic Cabling for Customer Premises

10. County of Los Angeles, California

    a. Internal Services Department/Los Angeles County Building Telecommunications Wiring Standard 902

11. National Fire Protection Association (NFPA)

    a. ANSI/NFPA-70 National Electric Code (NEC)
    b. ANSI/NFPA-75 Standard for the Protection of Information Technology Equipment

12. National Electrical Manufacturers Association (NEMA)

13. Occupational Safety and Health Administration (OSHA)

14. Telecommunications Industry Association (TIA)

15. Underwriters Laboratories Standards (UL)

B. The contractor shall be responsible for obtaining and utilizing the latest Communications Cabling, Architectural, and Electrical plans.

1.3 GENERAL REQUIREMENTS

A. Manufacturer: The term “manufacturer” shall be defined as the company, or group of companies, that actually produces the products meeting the requirements of PART 2 of this document. The manufacturer shall have a minimum of seven- (7) year’s experience in manufacturing products of this type and shall be ISO 9001 Certified. The products, summarized in this specification, shall be supplied by a single manufacturer, with the exception of:

1. Data racks and other hardware that is not defined as part of the channel test configuration by ANSI/TIA/EIA 568-C.

2. Cables manufactured by another manufacturer specifically called out on the drawings.

B. Contractor: The term “contractor” shall be defined as the company, or group of companies, that actually installs the products per PART 3 of this document. [In the following, “contractor” and “communications contractor” will be used interchangeably, and the requirements stated herein shall be applicable to all] The contractor selected to provide the installation of this system shall be certified by the manufacturer in all aspects of design, installation and testing of the products described herein.

1. The contractor shall hold current State of California C-7, and C10 Low-Voltage licenses, and shall have completed at least ten (20) projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least seven (7) years, and capable of being bonded to assure the Owner’s Representative of performance and satisfactory service during the guarantee period.

2. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.

3. All work shall be performed under the supervision of a company accredited by the manufacturer and such accreditation must be presented.

4. The contractor shall be a manufacturer’s authorized/certified installer and warranty station for the equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Contractor must be certified by the manufacturer a minimum of 180 days prior to bid opening.

5. The contractor selected for this Project must adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.

6. The contractor shall own and maintain tools and equipment necessary for successful installation and testing of fiber optic cable and Category 6 metallic premise distribution systems and have personnel who are adequately trained in the used of such tools and equipment.

7. The contractor shall have the capability to produce the AutoCAD documentation as required elsewhere in this specification.

1.4 SUBSTITUTIONS

A. It is the intent of these specifications to establish an installation standard of quality for labor and materials.

B. Proposed equal products (substitutions) shall be presented in addition to the specified product. The contractor must be prepared and qualified to provide and install the specified product in the event that the proposed equal is rejected.

C. For any proposed equal product substitution a complete descriptive, technical comparison, cost comparison, warranty information, and independent testing laboratory report package shall be submitted to the Owner for review with the bid package. Proposed equal products shall be submitted and documented per the submittal requirements outlined elsewhere in this specification.

D. A “Substitution Compliance Form”, signed by the contractor, shall be submitted along with any proposed equal substitution. The form shall state that if the proposed substitution is accepted, the project schedule will not be negatively affected. If the completion of the project is delayed because of the approved substitution, the contractor will be responsible for payment of any established liquidated damages.

E. The Owner reserves the right to require a complete sample of any proposed equal item per the product sample submittals section elsewhere in this specification. The product sample shall be provided at no cost and shall remain the property of the Owner.

F. The owner shall not be held responsible for any project delays caused by product substitution review.

G. If an “equal” item is given final acceptance by the Owner, the Contractor shall reimburse the Owner for any additional engineering charges and shall pay all charges of other trades resulting from this products use, at no cost to the Owner.

1.5 GENERAL SUBMITTAL REQUIREMENT

A. Submittals shall be presented and formatted per the guidelines in the Division 1 sections of of these specifications.

B. Submittal shall be furnished in an 8 ½" x 11" format in 3-ring loose-leaf binders. The cover and the title page shall bear the project name, capital project number, specification number, name of contractor and date. The document shall have a table of contents and page numbers on each of the pages including brochures and drawings.

C. Drawings shall be no larger than 34" x 22". Drawings larger than 8 ½" x 11" shall be folded to 8 ½" x 11" so that the drawing's name and page number are visible and can be unfolded without being removed.

D. Reproduced material shall not be subject to fading by light or heat and shall have high contrast for easy reading.

E. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which

product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.

1.6 PRE-INSTALLATION SUBMITTAL REQUIREMENTS

Within thirty (30) calendar days after the date of award of the Contract, the Contractor shall submit the following:

A. Submittal Binder: Submit nine (9) copies of the complete Submittal Binder to the Owner for review. [Three (3) copies to the County Capital Project Section, two (2) to the ISD Telecommunications Systems Engineer, and (3) for General Contractor and Architect.] The binder shall consist of five major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.

1. The first section shall be the "title sheet" which shall include the submittal date, project title and address, name of the contractor, and name of the Owner.

2. The second section shall contain proposed material list including manufacturer's name, model number and technical data for all equipment the contractor proposes to install. Items shall be identified by specification section and paragraph number. The technical data shall consist of copies of factory issued catalog sheets or brochures, which give ratings and specifications for the proposed items. Include statement describing exceptions being taken, if any, to the specifications wherein the submitted equipment or design varies from that originally specified.

3. The third section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in PART 2 of this specification and all materials described on the construction drawings. Also include manufacturer’s cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the index.

4. The fourth section shall contain Single line system diagram identifying and showing interrelationships between equipment items and how they are interconnected. The diagram shall be based on the drawings included in the Construction Documents. It shall be updated to show quantities and part numbers for all components including patch panels, cable, conduit, cabinets and equipment racks, splices, splice cases and all other associated components.

5. The fifth section shall contain shop drawings showing details of fabricated items, rack elevation drawings, console arrangements and schematics of custom designed items.

6. If the contractor fails to list a particular variance and his submittal is accepted, but subsequently is deemed by the County to be unsatisfactory because of an unlisted variance, the contractor must replace or modify such equipment at once and without cost to the County.

7. For any exceptions that are not approved by County, contractor shall resubmit the information in complete compliance with the specifications and drawings.

8. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.7 POST-INSTALLATION SUBMITTAL REQUIREMENTS

Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:

A. Record Documentation

1. Record drawings shall be made on separate clean blueline prints of the electrical drawings issued by the County or Architect and shall be reserved for the purpose of showing work as actually installed, including accurately dimensioned locations of all conduit stub-outs and pull boxes, routing of all conduits extending from or between buildings and locations of all telecommunications equipment not installed according to drawings.

2. Drawings shall be kept up to date with neat and legible annotations made thereon daily as work proceeds, showing work as actually installed. Additional sheets may be attached to show greater detail. Drawings shall be available at all times for inspection and shall be kept on the job at a location designated by the County.

3. Contractor at his option may use an additional set of drawings for daily field annotations. This set of drawings shall be kept at the site.

4. Final record drawings shall be submitted with floor numbers, room numbers, panel directories and all other identification necessary to conform to number designations for occupancy rather than to construction numbers. All buried conduit and/or underground conduits stubs intended for future extension shall be accurately shown as to depth and exact measurement from a permanently established landmark, such as building or structural features.

5. On completion, record drawings shall be signed, dated and returned to the County for inspection and approval before acceptance of any work.

6. Provide four (4) sets of drawings [Three (3) sets of drawings to County Capital Projects Section and one (1) set to ISD Telecommunications Systems Engineer.]

B. Final Submittal

Three (3) complete sets of the Final Submittal including a full set of the drawings on vellum shall be delivered to the County Capital Projects Section and two (2) complete sets to the ISD Telecommunications Systems Engineer prior to acceptance tests and as a condition for final payment for the project to the contractor. It shall include all the information necessary to maintain each system, and shall consist of the following:

1. Operators Instructions (as applicable).

2. Factory-issued Service Manuals for each piece of equipment installed. The manuals shall contain complete parts lists, detailed schematics, circuit descriptions, maintenance procedures and trouble-shooting methods. In the event such manuals are not available from the factory, it shall be the responsibility of the contractor to compile and submit the required information.

3. A System Manual for each system furnished. This manual shall complement the above service manuals with all necessary additional information unique to the system that is not otherwise provided, such as a list of applicable service manuals, options selected, jumper or

strapping choices, modifications, and detailed wiring information. All manuals shall be bound in a 3-ring binder with tabs identifying each system.

4. Record Drawings (see “Record Documentation” above).

5. Two (2) electronic copies of all drawings in AutoCAD (latest version), shall be provided. [One copy to the County Capital Project Section and one copy to the County ISD Telecommunications Systems Engineer.]

6. Final Test Results

    a. Test results for each cable indicating tests performed, results obtained and values measured. Test results shall be provided in electronic format with the associated application (if required) for viewing.

7. As-Built Drawings: Contractor shall provide a complete set of professionally drafted "E" size (30" x 42"), unless otherwise noted, reproducible bond as-built drawings, generated on AutoDesk AutoCAD (latest version).

    a. MDF, BDF and IDF Diagrams - Including:

        1) Cable routing.
        2) Position of all components and apparatus.
        3) Detailed layout of the wallfield(s).
        4) Labeling plan.

    b. Work Area Floor Plans - Including:

        1) Detailed cable routes.
        2) Labeled workstation locations.Labels to match approved workstation faceplate labels.

    c. Cross Connect Documentation - Including:

        1) Cross-connect records for all voice, and data devices.

    d. Riser Distribution Plan.
    e. Cable Tray, Conduit, and Raceway Plans.
    f. Campus Distribution Plan.
    g. Building Control Plans.

C. As-Built Documentation Display in each MDF, BDF & IDF.

1. Contractor shall install a complete Contractor-provided, professionally drafted as-built floor plan in color in each MDF, BDF & IDF mounting frame. Each floor plan, generated on AutoDesk AutoCAD (latest version) and printed in color, shall depict all jack locations in all areas. Also depicted shall be in-building antenna, reader board, CTV jack locations or any other communications outlet cables by the contractor. All jack locations shall be color coordinated with the Owner’s labeling scheme as described elsewhere in this specification.

D. Warranty Documentation:

1. Contractor shall present to Owner all warranty General and Specific Warranty Documents per Warranty Specifications Sections. Warranty shall commence after final acceptance of System by Owner.

1.8 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. Prior to Owner acceptance, the contractor shall provide to the Owner's Representative, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The Owner will only acknowledge acceptance upon submittal of a valid manufacturers warranty.

B. The warranty shall commence from the date of the Owners final written acceptance of the completed project.

C. All conditions for obtaining the manufacturers warranty shall be the sole responsibility of the contractor.

D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the Owner after the end of the guarantee period.

E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

1.9 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. A twenty (20) year Extended Product Warranty and Application Assurance for the voice / data wiring system shall be provided as follows:

1. 20 Year Extended Product Warranty

a. The 20 Year Extended Product Warranty shall ensure against product defects, that all approved cabling components exceed the specifications of ANSI/TIA/EIA 568-B and ISO/IEC 11801, exceed the attenuation and NEXT requirements of ANSI/TIA/EIA 568-B and ISO/IEC 11801 for cabling channels, that the installation will exceed the loss and bandwidth requirements of ANSI/TIA/EIA 568-B and ISO/IEC 11801 for fiber channels, for a twenty (20) year period. The warranty shall apply to all passive communications cabling components.

b. The 20 Year Extended Product Warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s) for a twenty (20) year period.

2. 20 Year Application Assurance

a. The 20 Year Application Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future, up to 350Mbps parallel transmission schemes, by

recognized standards or user forums that use the ANSI/TIA/EIA 568-B or ISO/IEC 11801 component and channel specifications for cabling, for a twenty (20) year period.

3. System Certification

   a. Upon successful completion of the installation and subsequent inspection, the Owner's Representative shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. All equipment listed herein will be by:

1. Communications [Structured] Cabling System: Panduit/General "PanGen" Category 6 – County Standard

2. Cabinets, Racks, and Ladder tray: Chatsworth – County Standard.

3. Vertical wire management: Panduit – County Standard

4. Riser and OSP Fiber Cable: Corning – County Standard

5. Riser and OSP Copper Cable: General or Superior Essex

6. Protectors: Circa, Porta Systems.

B. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.

C. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.2 CABLING SYSTEM

A. STATION CABLE (VOICE/DATA)

1. The Communications Contractor shall be responsible for obtaining a low voltage installation permit from the appropriate authority prior to start of installation.
2. The Communications Contractor shall be responsible for consulting with the building inspector to determine whether there are special local requirements for strapping the cables in the attic area.

3. The Communications Contractor shall be responsible for coordinating with the building's General Contractor to determine the cable routings, schedules for cable placement and ceiling inspection.

4. The Communications Contractor shall provide installation of the Caddy J-Hook system cable hangers and sleeves that will support the horizontal cables in the attic area per all applicable local building code(s).

5. The Communications Contractor shall furnish and install voice/data locations, voice only locations, and data only locations per approved floor plans.

6. The Communications Contractor shall furnish and install whips, wall plate adapters and floor plate adapters as shown on the plans.

7. All voice/data outlets shall be furnished and installed complete with four (4) data jacks (Cat 6, RJ45) terminated with four (4) Cat 6 plenum rated cables unless otherwise noted on the plans.

8. All data cables shall be General Cable GenSPEED 6000 Enhanced Category 6 plenum rated 23 AWG, 4-pair, blue jacket cables. No substitutions will be allowed without prior written approval from the Owner's Representative. All cables shall be installed from the station jack directly to the appropriate Cat 6 patch panels in the telecommunications room [MCR, TR]. All cable pairs or modular jacks shall be wired to ANSI/TIA/EIA568-B using T568-A wiring scheme at both ends. All cables shall be tested to minimum Cat 6 standards.

9. The jack housings and faceplates shall have four (4) positions for jacks. Blank covers shall be installed in vacant jack positions. Jack housings and faceplates shall be compatible with the Panduit Mini-Com Jacks. The type and color is to be determined by the installed location. Some will be flush or non-flush. Modular furniture faceplates shall be color-coordinated with the color of the furniture base plate. The Communications Contractor shall furnish and install the proper jack housings and faceplates. The Communications Contractor shall determine the type and color of faceplate prior to the scheduled installation and must be approved by Owner prior to use.

10. Floor monuments shall be flush mounted and fully adjustable with one (1) inch conduit knockouts, unless otherwise noted on the plan. Depending on the amount of gang boxes required on the floor monument, Hubbell Floor Boxes B243641, B423341 or B433361 shall be used as required. Cover plate shall be Hubbell S3825. If applicable, corresponding carpet flanges shall be SB3083, SB3084 or SB3085. Any deviation must have a written approval from the Owner prior to installation.

11. Floor monument mounting plates shall be Panduit CF-1064EI.

12. The Communications Contractor shall furnish and install patch panels and wire managers or organizers. Separate patch panels shall be provided for the data and analog telephone jacks. The patch panels shall be Panduit Mini-Com 48 port all metal modular, part number CP48BLY. The horizontal wire organizers shall be Panduit WMPH2E and WMPSE as required and as shown on the Equipment Rack Layout. Furnish one (1) horizontal wire organizer per patch panel plus one (1) additional wire organizer at the top of each row of patch panels. Be sure to include the Panduit Mini-Com Jacks on the patch panel. Vertical wire managers shall also be furnished and installed as required using Panduit WMPV45E or WMPVHC45E as specified in the Equipment Rack Elevation layout.

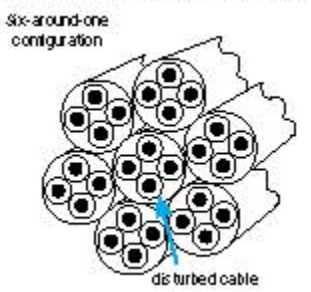
13. All RJ45 modular data jacks shall be wired according to ANSI/TIA/EIA 568-B using the T568-A wiring scheme.

14. All jacks shall be modular Panduit Mini-Com Jacks. All jacks (Cat 6, RJ45) shall be Panduit Mini-Com Jacks part number CJ688TGOR (Orange) or CJ688TGBU (Blue) as shown on the plan. No substitutions will be approved.

15. The areas shall use Ivory jacks.

16. All wire and cable runs in the ceiling area shall be supported with Caddy J-Hook system ceiling hangers, supplied and installed by the Communications Contractor. Cables must be supported at a space interval that is allowable by code. At no point shall cable(s) rest on acoustic ceiling grids, panels, lighting support wires, electrical conduit and HVAC pipes or ducts.

17. Cable shall be installed in continuous lengths (no splices allowed) from the station jacks to the telecommunications room [MCR, TR] patch panel ports, using the shortest route possible, and shall be tight bundled in groups of no more than six-around-one, and combined bundles of six-around-one of not greater than three bundles or a total of 21 cables.



18. The data cables shall be bundled with a Velcro type of tie, such as Panduit HLS, HLM, HLC or equivalent. Do not use plastic ties on data cables.

19. Furnish and install flexible tubing (Seal Tite) to conceal wire runs into modular furniture or where needed to secure multiple exposed cables.

20. It shall be the responsibility of the Communications Contractor to determine and furnish the quantity of voice/data cable needed.

21. The Communications Contractor shall furnish and install three (3)-Category 6 cables with three (3)-RJ45 jacks; two (2) of the RJ45 jacks shall be installed adjacent to the Fire Alarm Communicator Panel and one (1) adjacent to the Intrusion Alarm Panel. The other end of the alarm cable should terminate on the 66 blocks mounted (not on the telecommunications room MCR/TR patch panel) adjacent to the Telco panel in the MCR backboard. This will be used to connect the telephone lines to the alarm systems. The telephone lines to be used will be ordered by Owner. The Communications Contractor shall cross-connect the telephone lines from the Telco panel binding post to the 66 block. The alarm contractor will connect the telephone lines to the alarm systems.

B. WORKSTATION OUTLETS

1. Unless otherwise noted on the plans, each outlet location installed on the wall, on the modular furniture system, or on the floor, shall be equipped with four (4) Category 6 RJ45 type data modular jacks, color-coded Ivory.

2. Each outlet location shall be provided with four (4) Cat 6 cables unless otherwise -shown on the plan.

3. All jacks shall be Category 6, 8 position, 8 wire with termination cap color, wired to the ANSI/TIA/EIA 568-B using the T568-A wiring scheme. All jacks shall be manufactured by Panduit (CJ688TGOR or CJ688TGBU). No brand substitutions will be accepted by the County.

4. Panduit (CFPE4) shall be used to mount jacks on a four- (4) module, Electrical Ivory, faceplate for the wall.

5. Where outlet location is specified for a wall-mounted telephone, provide and install a voice cable terminated on a RJ45 jack with a single module faceplate by Panduit (Phone Plate with module - KWP3Y).

6. Provide and install appropriate faceplate extenders as determined by modular furniture brand. The Communications Contractor shall determine bracket type and color prior to scheduled installation.

7. If faceplates are mounted to double gang boxes, the Communications Contractor shall provide and install, as required, In-Wall box adapters as manufactured by Panduit.

8. The Communications Contractor shall be responsible to install cover plates or blank modules of the appropriate color on any unused single or double gang boxes. Modules shall be Panduit (CMB).

9. The Communications Contractor shall furnish and install cross-connect jumpers for telephone lines as required from the MPOE to MCR, between MCR's and IDF's and for faxes, modems, elevator phones, fire alarm and security systems, etc. as required.

10. Any deviation/substitution must be verified and approved in writing by the Owner prior to use.

C. WIRELESS NETWORK ACCESS POINT (AP) CABLES

1. Each wireless AP location will require two (2) data cable runs to the Telecommunications Room [MCR, TR]. The data cable shall be GenSPEED 6000 Enhanced Category 6 cable, 23 AWG, 4-pair unshielded twisted pair, plenum-rated (CMP), with blue outer jacket, terminated with RJ45 Mini-Com jacks part number CJ688TGOR (Orange) on both ends (outlet and patch panel side). For suspended T-bar ceiling installations, the jacks shall be mounted on a dual-port Panduit surface mount box (UICBX2IW-A). The APs shall be attached to the ceiling T-bar using the mounting bracket supplied with the AP unit. For hard ceiling installations, the jacks shall be mounted on the single-gang box (installed in the ceiling) with a dual-port Panduit faceplate (CFPE2IWY).

2. The Contractor shall patch the WAPs as per the Patch Schedule provided by the Owner or as required with “orange” patch cords (at device end) and “Yellow’ patch cords on the patch panel.

3. The locations of Cisco WAPs and Category 6 cable runs shall be as shown in the drawings.

4. The WAPs shall be installed per the manufacturer's installation guidelines, below ceiling and horizontally mounted with logo facing downward. Vertical installation of the WAPs will not be allowed. Any deviation will require prior approval of the Owner. Oberon Model 1029 wall-mount bracket shall be used for wall-mounted WAP installations. The jacks shall be mounted on a dual port faceplate mounted on a single-gang box. When aesthetics is strictly required by the architect, Terrawave Model TWC-AC-BKT-L mounting bracket shall be used for above T-bar ceiling installations. For below suspended ceiling/T-bar ceiling installations, use Ceiling Grid Clip, Recessed (AIR-AP-T-Rail-R), if the ceiling tiles land below the ceiling grid. Use Ceiling Grip Clip, Flush (AIR-AP-T-RAIL-F) if the T-bar ceiling tiles are flush with the ceiling grid. For hard ceiling installations with data outlet boxes mounted on the ceiling, Universal Mounting Bracket (AIR-AP-BRACKET-2) shall be used.

D. PATCH CABLES

1. The Communications Contractor shall furnish patch cords per length, color and quantity specified by Owner.
2. Patch cords shall be Panduit Category 6, 23 AWG stranded, 4-pair assemblies with RJ45 plugs on both end, straight through (no pair reversals), and "slender strain" relief and "clear" boot type, Category 6, UTPSP, patch cords. The Communications Contractor shall be responsible for the installation and dressing of all patch cables in the MCR, TR and Workstations based on the Patch Schedule provided the Owner.

E. DISTRIBUTION CABLING

1. Voice Cabling

   a. The Communications Contractor shall provide, install and terminate an appropriately sized, CMR or CMP rated cable (as determined by the Owner), to provide connectivity between the MPOE and TR/MCR.
   b. Backbone cables shall be installed separately from the station cables. Where both cables are installed in a cable tray or wire way, backbone cables shall be installed first and bundled separately from the station cables.

2. Outside Plant Copper Cables

   a. All voice grade wire and cable placed in the outside environment shall be solid 24 AWG, twisted pair, and multi-conductor. The copper twisted pairs shall have a mutual capacitance at 1kHz of 15.7 nF/1,000 ft. The cable shall be resistant to mechanical damage, lightning or damage from wildlife.
   b. The buried or underground cable shall have an aluminum steel polyethylene (ASP) sheath and a core of solid-copper conductors, dual insulated with foam skin and plastic, surrounded by FLEXGEL III filling compound.
   c. ISO 9001 Certified Manufacturer: Systimax or listed equal buried/underground CSI ANMW.

3. Copper Riser Cables: Shielded or unshielded 24 AWG multi-pair copper cables shall be used as the vertical riser cables. The cable shall support voice, data and building service applications. The bending radius and pulling strength requirements of all backbone cables shall be observed during handling and installation. The multi-pair copper cables shall be in plenum or riser rated form and placed in conduit as required.

    a. Shielded: The shielded cable, 200 pair or more, shall consist of solid-copper conductors insulated with expanded polyethylene covered by a PVC skin, be conformance tested to meet ANSI/TIA/EIA 568-B for Category 3 cables, be UL and Listed as CMR. The core shall be overlaid with a corrugated aluminum sheath, which is adhesively bonded to an outer jacket of PVC plastic to form an ALVYN sheath. The copper riser cable shall meet or exceed the following electrical specifications listed below:

4. The PVC sheath shall have improved frictional properties, allowing it to be pulled through conduit without the use of lubricants.

5. The cable shall be available in 25, 50, 100, 150, 200, 300, 400, 600, 900, 1200, 1500, and 1800 pair counts.

6. Miscellaneous:

    a. UL Listed for Fire Safety
    b. ISO 9001 Certified Manufacturer

7. Product Specification: Systimax ARMM type cable or listed equal.

    a. Non-shielded: The non-shielded non-plenum cable shall consist of 24-AWG solid-copper conductors insulated with color coded PVC, 25 pair cable shall be UL Verified to ANSI/TIA/EIA 568-B for Category 3, 25 to 100 pair shall be conformance tested to meet ANSI/TIA/EIA 568-B for Category 3 cables. The non-shielded cable shall be available in 25, 50, 75 and 100 pair.

8. Miscellaneous:

    a. UL Listed for Fire Safety
    b. ISO 9001 Certified Manufacturer

9. Product Specification: General Cable

F. FIBER OPTIC CABLING

1. If required, fiber optic cable shall be jacketed as appropriate for use in an underground environment.

2. The cable shall be composite, tight buffered, all dielectric, Kevlar strength members with polyethylene outer jacket (medium or high density) with 600 lbs pull-strength. Individual fibers shall be covered with a 900-micron primary buffer. Corning Cable Systems Indoor and Outdoor Buffer Tube Fan-Out Kits shall be used on both ends of the fiber cable to provide the ultimate fiber strand protection and management for the field installation of connectors and for the termination of 12-fiber buffer tubes. Corning Cable Systems Standard Recommended

Procedures shall be followed when installing the Fan-Out kits. The cable shall contain continuous glass with Corning or Lucent Technologies glass only, and no splices.

3. The cable shall consist of 8 Multi-mode fibers and 4 Single-mode fibers and shall meet or exceed the following specifications.

    a. Multi-mode OM4: diameter (microns) 50/125 Laser Optimized Multi-mode fiber (LOMMF); dual window (850/1300): maximum attenuation @ 850/1300 nm < 3.15/1.5 db/Km: minimum bandwidth (MHz-km) @ 850/1300 nm, 160/500: graded index.
    b. Single-mode: diameter (microns) 8.3/125: dual window (1310/1550) maximum attenuation @ 110/1550 nm, < 4.3 db/km.
    c. The Communications Contractor shall ensure that the multi-mode fiber optic cables can support FDDI, 100Base-FX, and 1000Base-FX, 10GBBASE-S, 10GBASE-LX4, 10GBASE-LRM, 40GBASE-SR4, 100GBASE-SR10 protocols, and the single-mode fiber optic cables can support 1000Base-LX, 1000Base-SX protocols, 10GBASE-LX4, 10GBASE-L, 40GBASE-LR4 and 100GBASE-LR4.
    d. The Communications Contractor shall furnish and install a rack-mounted 12-port fiber distribution enclosure by Siecor or equivalent, fully equipped with couplers in the MCR. Note: The Fiber Patch Panel Assemblies shall be mounted above the core chassis on the relay racks or as shown on the Equipment Rack Layout.
    e. The Communications Contractor shall furnish, install and terminate all fiber optic strands on ceramic type of ferrule connectors in each distribution enclosure or fiber distribution panel, install LC or SC type of connectors for the multi-mode cables and LC or SC for the single-mode cables as required or directed by the Owner.
    f. The Communications Contractor shall also furnish and install one-inch diameter inner-duct (orange color) for the complete fiber runs.
    g. The Communications Contractor shall furnish and install each span of the fiber optic cables in one continuous length, no splices, utilizing building conduits and sleeves.
    h. The Communications Contractor shall provide all hardware required for terminations and for securing cable, such as clamps, tie-raps, soft buffer, spiral wrap or split loom, LC/SC connectors, etc.
    i. The Communications Contractor shall leave at least ten (10) feet of fiber optic cables slack on top of cable tray.
    j. The Communications Contractor shall provide other services, if required, to complete, such as: tighten barrel connectors, secure cable to fiber distribution panel, and install connectors to couplers, place fiber distribution enclosures in rack.

4. The Communications contractor shall provide Duplex fiber patch cords per connector type (LC/LC, SC/SC or LC/SC), length, color and quantity required or specified by the Owner.

    a. Specifications Outside Plant Cables:

5. Maximum attenuation @ 850/1300 nm 3.0/1.0 dB/km. The core shall be filled with a water-blocking compound and be suitable for underground conduit, direct burial or aerial applications.

2.3 TERMINALS AND EQUIPMENT RACKS

A. Terminal Backboards: Where indicated on drawings, provide new plywood terminal backboards. Use Douglas Fir Plywood, exterior grade, finished one side and prime coat painted on all surfaces with a finish coat of fire retardant intumescent white enamel. On each plywood sheet leave one (1) Fire Marshal Stamp unpainted for inspection. Unless otherwise indicated, use 8'-0" high x length as shown on drawings x 3/4" thick plywood. See backboard elevations for more information.

B. The contractor shall provide and install equipment racks that are earthquake rated for Zone 4. All racks installation shall be in accordance with the Los Angeles County Standard 902. This standard will require the use of a 3-inch spacer bar (B-Line P/N STD108DET4) or the Chatsworth Cable Tray Elevation Kit (P/N: CPI 10506-702) to attach the rack to the cable tray.

C. The contractor shall provide and install standard 2-Post relay racks, 19"W x 7'H (Chatsworth P/N 48353-703 or P/N 55053-703, 45 RMU), color black, heavy duty rack shelves and cable trays as shown on the plans. 4 posts relay racks, 19"W x 29"D x 7'H (Chatsworth P/N 50120-703, 45 RMU), black color, shall be used to mount the Network equipment, UPS and batteries. The contractor shall install, position, reposition, or remove racks and equipment as required without disruption of ongoing services. The contractor shall furnish extension cables, power taps, or temporary racks if needed.

D. All equipment racks shall be augmented with horizontal and vertical wire management hardware, both front and back as required, to properly dress cables and patch cords.

1. The horizontal wire organizers shall be Panduit WMPHF2E and WMPFSE as required or as shown on the Equipment Rack Layout. Furnish one (1) horizontal wire organizer per patch panel plus one (1) additional wire organizer at the top of each row of patch panels. Be sure to include the Panduit Mini-Com Jacks on the patch panel. Vertical wire managers shall also be furnished and installed as required using Panduit WMPVHC45E.

E. The number of equipment racks shall be as shown in the Drawings.

F. All voice/data cables shall be terminated on separate patch panels in the MCR and TR. Separate patch panels shall be allocated for data and analog telephone ports. The cables shall be terminated and labeled sequentially on the patch panels.

G. Cable trays shall be Chatsworth Products, INC. (CPI) P/N 11252-713, black color.

H. All structural ironwork shall be UL-certified, providing the best bonding for static and grounding. Painted structural ironwork is not allowed.

I. Cable tray shall be of the tubular type construction. The tray shall be installed with the rungs on the topside of the tray. All attachments to drywall shall be on ¾" plywood.

J. Cable trays shall be mounted at 7'3" above the finish floor. This will require the installation of a 3" (Black) spacer manufactured by B-Line Systems, INC., P/N STD108DET4 or the Chatsworth Cable Tray Elevation Kit (P/N: CPI 10506-702). The B-Line part number is not cataloged and requires special order. The 7'3" allows for the cable tray to be positioned over the 7' doorway.

K. Structural cable tray, relay racks, cabinets, systems, attachments and earthquake bracing shall comply with Zone 4 earthquake, NEMA, NEC and TIA/EIA-569 standards. Floor mounting

hardware shall be a 3/8" bolt, lock washer, flat washer, with anchor in the floor, quantity as required.

L. All exposed cut and sharp edges shall be deburred and filed to a safe finish. Cable tray runway ends shall be capped with a black rubber cap.

M. Relay racks shall be high strength aluminum construction with universal 5/8"-5/8"-1/2" tapped mounting hole #12-24 thread pattern on both front and rear. Designed and seismic built to the EIA-310C Standard.

N. All cable tray and racks shall be individually grounded to the Telecoms Ground Bus Bar using the standard ground lug and #6 AWG stranded ground copper wire with "Green" jacket or insulation. Daisy chaining the ground wire between racks is not allowed.

O. The Communications Contractor shall install, position, reposition, or remove racks and equipment as required without disruption of ongoing services. The Communications Contractor shall furnish extension cables, power taps, or temporary racks if needed.

2.4 WIFI WIRELESS NETWORKS

A. LACWiFi Wireless Network

1. The intent is to provide authorized County employees with access to the LACWiFi Wireless Network, which provides controlled access to County information systems and networks via the County-side Enterprise Network. The LACWiFi Wireless Network requires user authentication utilizing a SecurID Token in order to gain access.

B. WiFi Public Wireless Network

1. The intent is to provide the public with Internet access utilizing a separate VLAN WiFi Public Wireless Network, routing users directly to the Internet via the County-side Enterprise Network.

C. Wireless Network Access Points

1. The intent is to provide centrally located (ceiling -mounted) Cisco Lightweight (controller-based) wireless access points to the LACWiFi Wireless Network and WiFi Public Wireless Network as shown on the drawings. Wall-mounted access points shall use the Oberon (p/n: 1029-00) wall-mount bracket. Exact locations are to be reviewed and verified with Owners Representative. Authorized models are stated below.

2. Internal access points shall be Cisco 3600 Series access points per part numbers and licenses enumerated below:

   a. 802.11n CAP w/CleanAir; 4x4:3SS; Mod; Int Ant; A Reg Domain – AIR-CAP3602l-A-K9 (Quantity depends on per site/project requirements).
   b. Cisco 3600 Series IOS Wireless LAN Recovery -SWAP3600-RCOVRY-K9 (qty – depends on per site requirement).
   c. Primary SKU for all upgrade options on the Cisco 5508 WC -LIC-CT5508-UPG (qty 1).

d. 25 AP Add License for the 5508 Controller - LIC-CT5508-25A (qty 1).

PART 3 – EXECUTION

3.1 CABLE INSTALLATION

A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the Owner's Representative before making any changes. It shall be the responsibility of the manufacturer-authorized installer of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. All materials shall be new. No used or re-manufactured parts or components shall be accepted.

C. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CM/G (General Purpose) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated) and/or OFN/G (General Purpose). The contractor is responsible for installing appropriately rated cable for the environment in which it is installed.

D. Cable Storage: The Contractor shall not roll or store cable reels without an appropriate underlay and the prior written approval of Owner's Representative.

E. All installation shall be done in conformance with ANSI/TIA/EIA 568-B standards and manufacturers installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines will require the Contractor to provide, in a timely fashion, any additional material and labor necessary to properly rectify the situation to the satisfaction and written approval of the Owner's Representative. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

F. The system must meet all local and other prevailing codes.

G. All cabling installations shall be performed by qualified technicians. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the Owner's Representative to engage in the installation and service of this system.

H. Special Equipment and Tools: In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a cable manufacturer's recognized special tool. It shall be the responsibility of the Contractor to furnish any special installation equipment or tools necessary to properly complete the System. This may include, but is not limited to, tools for terminating cables, testing and splicing equipment for copper/fiber cables, communication devices, jack stands for cable reels, or cable winches.

I. Under no circumstance are "channel locks" or other pliers to be used.

J. The cable's minimum bend radius and maximum pulling tension shall not be exceeded.

K. No cable is to be pulled through a conduit "L-bend" (condulets).

L. Conduit runs shall not exceed 100 feet or contain more than two 90 degree bends without utilizing appropriately sized pull boxes. Pull boxes are not to be used in lieu of a bend. It is the contractor's

responsibility to report any unusable or inadequate conduit runs to the owner prior to pulling any cable.

M. Reinstate all pull-wires in conduits and ducts after use to facilitate future addition of cables.

N. Cable raceways and conduits shall not be filled greater than the BISCI recommended fill for the particular raceway or conduit size.

O. The use of lubricants (i.e. Yellow 77, Polywater) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall use a lubricant specifically designed for the environment and type of cable being installed. (E.G. the use of outside plant, low temperature cable lubricants shall not be acceptable in an indoor plenum environment.) Under no circumstances shall cable pulling lubricant be allowed to accumulate on walls, floors, backboards, or other surfaces outside the conduit.

P. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor before final acceptance at no cost to the Owner.

Q. Each station cable shall have 1 meter of service slack configured in an “S” shape via J-hooks at rack or wall field end and 2 meters of service loop at station outlet end. Service slack shall be located within 15’ of the telecommunications room equipment rack to maintain a neat and “workmanship like” installation.

R. The length of each individual run of horizontal cable from the administration subsystem to the information outlet shall not exceed 295-ft (90 m).

S. Each run of cable between the termination block and the information outlet shall be continuous without any joints or splices.

T. All station cable shall be placed in the interior of walls unless otherwise noted or obstructed.

U. Provide bushings, grommets and strain-relief for cables terminating at wall-mounted outlets and patch panels to ensure durable and robust connections. The bushings and grommets are intended to protect the cables from any sharp edges that present a risk to the cables. Ensure that all sharp edges are covered to protect the cables from damage.

V. All cable bundles exiting floor or wall penetrations and running into furniture or casework shall be wrapped in spiral wrap or split-loom tubing to protect the cabling and provide a neat installation.

W. Power Separation: The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus. At no point shall the communications cables be tied to power cables or other building services. Station cables and tie cables installed within ceiling spaces shall be routed through these spaces at right angles to electrical power circuits.

X. Avoid electromagnetic interference (EMI) by maintaining adequate physical separation between telecommunications cabling and possible sources such as, but not limited to, electric motors, electric pencil sharpeners, transformers, fluorescent lights that share distribution space with telecommunications cabling, copiers that share work area space with line cords and terminals, large fax machines and power cords that supports such equipment.

Y. All cable or innerduct shall run parallel or at right angles to building wall structures.

Z. In suspended ceiling and raised floor areas where duct, cable trays or conduit are not available, cable bundles shall be supported via "J" hooks attached to the building structure and framework at a maximum of five (5) foot intervals. Minimum 1” wide J-hooks shall be appropriately sized to allow a minimum of 50% spare capacity for future cable installation. The contractor shall include

all costs in base bid for any additional supports/seismic bracing required by the Local Authority having Jurisdiction.

AA. The Contractor shall bundle, in bundles of 48 or less, station or other cabling with half inch hook and loop strips tight enough to hold the bundle together in a cylindrical shape, but not so tight as to deform the cable geometry. It shall be possible to completely rotate all cable ties around all cable bundles. Plenum rated hook and loop ties will be used in all plenum areas. In areas where 2 or more bundles are traveling in close proximity, utilize a Chatsworth Rapidtrak Cable support system.

BB. Cables or J hooks shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.

CC. Cables or J hooks shall not be attached to or supported by fire sprinkler heads or delivery systems or any environmental sensor located in the ceiling air space.

DD. Where additional conduit(s)/sleeve(s) are required, but not provided by the electrical contractor, the communications cabling contractor shall be responsible to provide such conduit(s)/sleeve(s). Conduit(s) and sleeve(s) shall be of suitable material, sized, installed, fire-stopped, and grounded as required by the NEC, ANSI/TIA/EIA standards and all other applicable codes and standards. Any conduit(s) and sleeve(s) added by the communications cabling contractor shall be approved by the Owner's Representative prior to rough-in.

EE. In the event Contractor is required to remove ceiling tiles, such work shall not break or disturb grid. Removal of the ceiling grid must be coordinated with the Owner's Representative. All insulation shall be replaced in its original location.

FF. Cabling and Termination Identifications: A numbering and marking scheme must be used to identify all cable and cabling terminations. All cables, regardless of length, shall be marked and/or numbered at both ends. Marking codes and methodologies shall correspond to the instructions in this specification.

GG. Ensure that all waste materials are disposed of in a safe manner. Pay particular attention to waste materials produced during the termination of optical fiber cabling. Ensure that all used components and fiber cut-offs are collected in purpose-made containers and disposed of properly. The contractor shall remove all debris and rubbish created in the course of this project. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., caused by the performance of this work.

HH. Conduits: All backbone cabling will run through dedicated conduits. All new conduits will be supplied with a pull string. Existing conduits shall be proven to be clear prior to pulling of cables. Contractor shall supply pull string and pull rope for the installation of all cables in existing conduits. For all conduits left with available capacity, Contractor shall replace pull strings with ¼-inch pull rope during the course of his work. Contractor must seal all conduits with an approved sealing compound.

II. Use purpose-built pulling grips during cable installation. Do not pull cables by attaching pull wires to cable jackets, elements or reinforcement. The cable pulling tension shall be applied smoothly without jerks. Use strain gauges or equivalent measures to ensure that the maximum manufacturer recommended tensile load rating of the cables is not exceeded during installation.

JJ. The number of cables in each conduit shall be controlled to allow for future cable installation and to stay within the manufacturers maximum allowable cable pulling tension. Conduit fill ratios shall not exceed the current requirements of the NEC.

KK. Provide expansion plugs in all ducts/conduits entering the building. Seal all unused ducts/conduits with plugs that allow the pull-string to be tied off on the inside.

LL. All cabling shall be splice free unless otherwise noted on drawings.

3.2 TELECOMMUNICATION ROOMS AND SUPPORT STRUCTURES

A. Equipment Racks and Cabinets: All equipment racks and cabinets shall be bolted to the floor by the contractor in the location shown on drawings.

B. Ladder tray mounting brackets shall be screwed to studs or to the properly mounted plywood wall field, not to drywall.

C. Seismic Requirements: Contractor will install all equipment racks, equipment cabinet enclosures, cable runways, etc. according to the local, state and/or federal code. Contractor will notify Owner's Representative of such requirements and shall provide such bracing as required.

D. Miscellaneous Equipment: The Contractor shall provide any necessary screws, anchors, clamps, distribution rings, wire molding (MC/MDF & TC/IDF locations), miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the System.

E. The cables within the rack or cabinets shall be numbered for identification.

F. Cable bundles within the MDF/BDF/IDF shall be dressed into bundles of no more than 48 cables. Maintain each bundle with half inch, hook and loop strips every 18 inches. On completion of installation, neatly run and re-tie all cable bundles in the Closet.

G. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc.

H. The contractor shall install all patch cords as required per drawings and specifications at the direction of the Owner's Representative in a neat and systematic fashion. Prior to installing all patch cords, the contractor shall install patch cords in a single rack to demonstrate work practices to the Owner's Representative. Only after any corrections/modification to the installation as directed by the Owner's Representative, may the contractor continue installing the patch cords in the remaining racks.

I. The Contractor shall be responsible for providing an approved ground at all distribution frames. The Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. All grounds shall consist of #6 AWG copper wire and shall be supplied from an approved building ground and bonded to the main electrical ground. All cable sheaths and splice cases shall be grounded to a Telecommunications Ground Bus. Grounding must be in accordance with the NEC, NFPA, ANSI-J-STD-607-A and all local codes and practices. Bond all metallic sheath communications cables entering the building per manufacturer specifications and NEC 770-33, 800-33 and 800-40.

3.3 LABELING AND IDENTIFICATION

A. Labeling: The Contractor shall be responsible for printed labels for all cables and cords, distribution frames, and outlet locations, according to the specifications. No labels are to be written by hand.

B. All voice/data jacks and patch panels shall be labeled according to Los Angeles County Standard 902. Labels are to be typed or printed with a labeling device and permanently affixed. No hand written lettering is acceptable. The labels shall be printed on white tape with black lettering for jacks. Patch panels shall be labeled both front and back. The patch panel labels shall be black tape with white lettering, four (4) labels per strip. Consult with the Owner's Representative if further clarification is needed.

C. Station Faceplate Labeling. The communications cabling contractor shall coordinate actual labeling scheme, compliant with ISD LA County Standard 902, prior to pulling cables.

D. Workstation Jack Labeling:

1. Example: DXYYYZZZ (Data jack) - D1001MCR, D1002MCR…

2. VXYYYZZZ (Voice jack) - V1001MCR, V1002MCR…

E. D stands for data, V stands for Voice, X stands for floor level, YYY is jack number starting from 001, and ZZZ is the telecommunications room serving patch panel. Alpha (A&B) lettering of data jacks in not allowed.

1. Data designation "D" and MCR shall not be required for the Patch Panel labeling.

a. Example: XYYY - 1001, 1002…

3.4 FIRESTOP SYSTEMS

A. A firestop system is comprised of the item or items penetrating the fire rated structure; the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and pressurized water stream.

B. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.

C. Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE, licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed firestopped system, stamped/embossed by the

cognizant PE shall be provided to the Owner's Representative prior to installing the firestop system.

D. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a duly factory authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminal are identified. Provide a list of final tap settings of paging speaker line matching transformers.

C. Testing:

1. Provide all instruments for testing and demonstrating in the presence of the Owner's Representative that the system is operating as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds. Perform all tests stated in each separate system specification.

2. Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at contractor's expense. Verify by the system test that the total system meets the specifications and complies with applicable standards.

3. The owner reserves the right to make independent tests of all equipment furnished to determine whether or not the equipment complies with the requirements specified herein and to accept or reject and or all of the equipment on the basis of the results thereby obtained.

3.6 CABLE SYSTEM TESTING

A. General

1. All testing shall be per the Los Angeles County STD-902 Testing Standard. An orientation with the Owner shall take place on site prior to the test. It shall be scheduled at least one week in advance. The Owner Representative shall certify prior to testing the following:

2. Test meters have been calibrated to TIA/EIA Standard within the last 12 months with a Certificate of Compliance, meter serial number and date of calibration.

3. Test meter shall be fully charged.

4. Test configuration set to the County Standards.

5. Manufacturer's warranty certification (if applicable) requirements shall be reviewed to ensure that all warranty requirements are met.

6. The Communications Contractor shall furnish two (2) printed copy and two (2) copies on CD-ROM, with the complete set of test results. [Copies of PC based software to view drawings and results shall also be provided to the ISD Project Manager.]

B. Communications Contractor Requirements

1. Communications Contractor shall provide sufficient skilled labor to complete testing within the agreed upon test period. Testing shall scheduled at the convenience of the Owner.
2. Communications Contractor shall have a minimum of 5 years experience installing and testing structured cabling systems. All installers assigned by the Contractor to the installation shall have factory certifications that they are qualified to install and test the provided products.
3. Communications Contractor is responsible for supplying all of the required test equipment necessary to conduct acceptance tests.
4. Communications Contractor is responsible for submitting acceptance documentation as defined below.

C. Test Process

1. The County reserves the right to be present during any or all of the cable testing.
2. Testing shall be of the Permanent Link. However, the Communications Contractor shall warrant performance (see Part 3) based on Channel performance and provide patch cords that meet Channel Performance.
3. All cabling not tested strictly in accordance with these procedures shall be re-tested at no additional cost to the County.
4. 100% of the installed voice and data cabling must be tested. All tests must pass acceptance criteria defined below.
5. Test equipment shall be fully charged prior to each day of testing.

D. Standards Compliance & Test Requirements

1. Cabling must meet the indicated performance specifications, TIA 568A Category 6
2. All test equipment used must meet the performance specifications defined below.

E. Documentation

1. Test reports must be submitted in hardcopy and electronic format. Hand-written test reports are not acceptable.
2. Hardcopy reports are to be submitted in labeled 3-ring binders with an attached affidavit verifying passing execution of all tests. For large installations, electronic reports with hardcopy summaries are preferred. Hardcopy summary reports shall contain the following information on each row of the report: circuit ID, test specification used, length, date of test, and pass/fail result.
3. Electronic reports are to be submitted on CD-ROM only. If proprietary software is required to view test results, the software shall be provided to Owner. If the results are delivered in a standard format like Excel, Access, CSV files, etc. then software to read these files need not be provided. Electronic reports must be accompanied by a Certificate signed by an authorized representative of the Contractor warranting the truth and accuracy of the electronic reports. Certificate must reference traceable circuit numbers that match the electronic record.
4. Test reports shall include the following information for each cabling element tested:
    a. Wire map results that indicate the cabling has no shorts, opens, missed wires, splits, reversed, or crossed pairs, and end to end connectivity is achieved. For Category 6

cabling: Attenuation, NEXT, PSNEXT, Return Loss, ELFEXT, and PSELFEXT data that indicate the worst case result, the frequency at which it occurs, the limit at that point, and the margin. These tests shall be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information shall be provided for all pairs or pair combinations and in both directions when required by the appropriate standards. Any individual test that fails the relevant performance specification shall be marked as a FAIL.

b. Length (in meters), propagation delay, and delay skew relative to the relevant limit. Any individual test that fails the relevant performance specification shall be marked as a FAIL.
c. Cable manufacturer, cable model number/type, and NVP
d. Tester manufacturer, model, serial number, hardware version, and software version
e. Circuit ID number and project name
f. Auto-test specification used
g. Overall pass/fail indication
h. Date of test
i. Test reports shall be submitted within 7 business days of completion of testing.

F. Test Equipment

1. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years experience in producing field test equipment. Manufacturers must be ISO 9001 certified.

2. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.

3. Test adapter cables must be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.

4. Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.

5. Test equipment must be capable of certifying Category 6 links.

6. Test equipment must be capable of storing full frequency sweep data for all tests and drawing color graphical reports for all swept measurements.

7. Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.

8. Test equipment must be capable of running individual NEXT, return loss, etc measurements in addition to auto-tests. Individual tests increase productivity when diagnosing faults.

9. Test equipment must include a library of cable types, sorted by major manufacturer.

10. Test equipment must store Category 6 auto-tests in internal memory.

11. Test equipment must be able to internally group auto-tests and cables in project folders for good records management.

12. Test equipment must include DSP technology for support of advanced measurements.

13. Test equipment must make swept frequency measurements in compliance with TIA standards.

14. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.

G. Fiber

1. The Communications Contractor shall perform end-to-end fiber optic strand testing per Los Angeles County Fiber Testing Standard with the following minimum quality levels: Optical Time Domain Reflectometer (OTDR) with drawings (both directions) and absolute dB loss (power meter), at 850 nanometers for multi-mode and 1310 nanometers for single-mode. All fiber optic cable lengths less than 600 feet shall require a certified kilometer to be used with the OTDR testing equipment. After testing on the reel has been successfully completed, fiber optic system shall be installed with all patch cords attached and then the entire channel shall be tested.

2. The Communications Contractor shall perform two sets of OTDR drawings with the above mentioned minimum quality levels. The first OTDR reading and drawings must be done on-site and submitted to the Owners Representative prior to the utilization of the fiber, and the second OTDR reading and drawings must be done after installation.

3. Upon completion of the fiber optic portion of this project, the Communications Contractor shall provide two complete sets of OTDR traces on 8 ½ x 11" sheets. The Communications Contractor shall annotate on each OTDR trace 1) direction of test per strand (from-to); 2) bundle number; 3) buffer color and 4) strand color. Communications Contractor-provided representations of the test data are not acceptable

3.7 CLEANING AND PROTECTION

A. The contractor shall thoroughly clean all equipment and materials. all exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc. The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., caused by the performance of this work.

END OF SECTION

SECTION 274010 – AUDIO-VIDEO SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes audio-video systems:

1. Cable television distribution system [CATV].
2. Video displays
3. Overhead paging system [PA].
4. Video conferencing systems.
5. Room-specific presentation/sound reinforcement systems.

1.2 SCOPE OF WORK

A. Provide all labor, materials, transportation and equipment to complete the furnishing, installation, assembly, set up, and testing of the Audio, Video and Control Systems work indicated on the drawings and specified herein. Notwithstanding any detailed information in this Section, provide complete, working systems. General design intent for this project is shown on the drawings and described in the specification.

B. All equipment requiring coordination with other trades must be tested and verified for proper operation. Contractor is fully responsible for the coordination and must resolve all conflicts with equipment that connect or interact with other systems.

C. Design, engineer and provide complete means of support, suspension, attachment, fastening, bracing, and seismic restraints (hereinafter "support") of the Work of this Section, including future installed equipment, in accordance with local building codes and regulations. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Contractor shall obtain the services of an engineer licensed to perform this work within the state or jurisdiction it is to be performed.

D. The Contractor shall pay for all costs associated with structural engineering required by code for work in this section.

E. The contractor must hire and pay a millwork contractor to cut holes, required for AV equipment, into furniture.

F. Conduit and common back boxes (four square, Hoffman boxes, junction boxes, etc) are by Division 26 Contractor.

G. Provide all cable and wire associated with this specification section.

H. All systems shall be completely installed with all of the necessary interconnection, power supplies, patch cords, snakes, portable equipment cables and wiring to provide a fully functioning system.

I. The governing overall requirement for this project is a complete and functional system.

J. Include work not usually shown or specified, but necessary for proper installation and operation of

the system or piece of equipment.

1.3 REFERENCES

A. Comply with all applicable governing the following applicable governing Codes and local regulations, including the following organizations and standards:

1. AES Audio Engineering Society
2. ANSI American National Standards Institute
3. ASTM American Society for Testing and Materials
4. BlCSl Building Industry Consulting Service International, Inc.
5. BTSC Broadcast Television Stereo Committee
6. CEDlA Custom Electronic Design and Installation Association
7. EIA Electronic Industries Alliance
8. ETL Electrical Testing Laboratories, Inc.
9. FCC Federal Communications Commission
10. lClA lnternational Communications lndustries Association
11. IEC lnternational Electrotechnical Commission
12. IEEE lnstitute of Electrical and Electronic Engineers
13. INCITS InterNational Committee for Information Technology Standards
14. IS0 lnternational Organization for Standardization
15. ITU lnternational Telecommunications Union
16. NAB National Association of Broadcasters
17. NCTA National Cable and Telecommunications Association
18. NEC National Electrical Code
19. NEMA National Electrical Manufacturers Association
20. NFPA National Fire Protection Association
21. NSCA National Systems Contractors Association
22. OSHA Occupational Safety and Health Administration
23. SMPTE Society of Motion Picture and Television Engineers
24. TASO Television Allocation Study Organization
25. TIA Telecommunications Industry Association
26. UBC Uniform Building Code
27. UL Underwriters Laboratories Inc.

1.4 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of all Divisions of these specifications.

B. All applicable portions shall apply to this section as though written herein completely.

1.5 GENERAL REQUIREMENTS

A. The contractor [in the following, “contractor”, “AV contractor”, and communications contractor” will be used interchangeably, and the requirements stated herein shall be applicable to all] shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

B. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.

C. All work shall be performed under the supervision of a company accredited by the basic equipment manufacturer and such accreditation must be presented.

D. The installing contractor shall be a factory authorized installer and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The installing contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractors shop.

E. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Installer of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Installer and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.

F. All audiovisual systems supplied shall be listed by Underwriter's Laboratories. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.

G. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Installer of the equipment with the most current software package available at the time of installation. At the time of Owner Acceptance of the installation, all equipment shall include any and all updated software or hardware revisions. In addition, when the software is available in disk format, a backup copy of the most up to date revision, in disk format, shall be handed to the Owner at the completion of the project.

1.6 QUALITY ASSURANCE

A. In order to maintain a high degree of quality assurance, the contractor shall, without exception, use the parts and supplies as specified in this specification.

B. For any proposed substitution, a complete descriptive, technical and cost comparison, and test report package shall be submitted to the Owner for review five (5) working days prior to the bid date. Final approval of the substitution item shall be at the option of the Owner, and written notice of the status of the proposed alternative will be supplied to all bidders prior to the final bid date. The Owner or its representative must approve any proposed substitution item in writing. The Owner reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by an independent testing consultant to prove equality. The decision of the Owner regarding equality of proposed equal items will be final.

C. It is the intent of these specifications to establish a standard of quality for labor and material to be installed. The Base Bid shall include materials as specified - without exception. Proposed substitutions, if approved in writing by the Owner, shall be listed on the bid form in addition to the specified materials.

D. Approved equal status does not imply final acceptance. Final acceptance of a substitution item shall be made by the Owner prior to the award of bid to the successful contractor, after reviewing

the bid information.

E. If a substitution item is given final acceptance by the Owner, the Contractor shall reimburse the Architect for any additional engineering charges and shall pay all charges of other trades resulting from the substitution, at no cost to the Owner.

F. If a substitution item is given final acceptance by the Owner, the contractor shall pay all charges (including travel, lodging, meals, etc…) required to provide factory certification, equal to that of a Factory Authorized Installer of the substituted item, for two (2) selected Owners representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected Owners representatives to provide any and all Factory / Manufacturer Approved repairs, services, software upgrades, etc… without affecting any available or applicable Manufacturer Warranties.

1.7 GENERAL SUBMITTAL REQUIREMENT

A. Submittals shall be presented and formatted per the guidelines in the Division 1 section of this RFP package.

B. Submittal shall be furnished in an 8 ½" x 11" format in 3-ring loose-leaf binders. The cover and the title page shall bear the project name, capital project number, specification number, name of contractor and date. The document shall have a table of contents and page numbers on each of the pages including brochures and drawings.

C. Drawings shall be no larger than 34" x 22". Drawings larger than 8 ½" x 11" shall be folded to 8 ½" x 11" so that the drawing's name and page number are visible and can be unfolded without being removed.

D. Reproduced material shall not be subject to fading by light or heat and shall have high contrast for easy reading.

E. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.

1.8 PRE INSTALLATION SUBMITTAL REQUIREMENTS

Within thirty (30) calendar days after the date of award of the Contract, the Contractor shall submit the following:

A. Submittal Binder: Submit nine (9) copies of the complete Submittal Binder to the Owner for review. [Three (3) copies to the Capital Project Section, two (2) to the ISD Telecommunications Systems Engineer, and (3) for General Contractor and Architect.] The binder shall consist of six major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.

1. The first section shall be the "title sheet" which shall include the submittal date, project title and address, name of the contractor, and name of the Owner.
2. The second section shall contain proposed material list including manufacturer's name, model number and technical data for all equipment the contractor proposes to install. Items shall be

identified by specification section and paragraph number. The technical data shall consist of copies of factory issued catalog sheets or brochures, which give ratings and specifications for the proposed items. Include statement describing exceptions being taken, if any, to the specifications wherein the submitted equipment or design varies from that originally specified.

3. The third section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in PART 2 of this specification and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the index.
4. The fourth section shall contain Single line system diagram identifying and showing interrelationships between equipment items and how they are interconnected. The diagram shall be based on the drawings included in the Construction Documents. It shall be updated to show quantities and part numbers for all components including patch panels, cable, conduit, cabinets and equipment racks, splices, splice cases and all other associated components.
5. The fifth section shall contain shop drawings showing details of fabricated items, rack elevation drawings, console arrangements and schematics of custom designed items.
6. The sixth section shall contain a designation schedule for each System component location and complete 1/8" = 1'-0" scale, 30" x x42" drawing showing system wiring plans and data showing loudspeaker coverage using the EASE Computer Aided Design Program. Provide drawings at 250, 500, 1000, 1000, 2000 and 4000Hz for each device and for all devices together.If the contractor fails to list a particular variance and his submittal is accepted, but subsequently is deemed by the County to be unsatisfactory because of an unlisted variance, the contractor must replace or modify such equipment at once and without cost to the County.
7. For any exceptions that are not approved by County, contractor shall resubmit the information in complete compliance with the specifications and drawings.
8. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.9 POST INSTALLATION SUBMITTAL REQUIREMENTS

Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:

A. RECORD DOCUMENTATION

1. Record drawings shall be made on separate clean blueline prints of the electrical drawings issued by the County or Architect and shall be reserved for the purpose of showing work as actually installed, including accurately dimensioned locations of all conduit stub-outs and pull boxes, routing of all conduits extending from or between buildings and locations of all telecommunications equipment not installed according to drawings.
2. Drawings shall be kept up to date with neat and legible annotations made thereon daily as work proceeds, showing work as actually installed. Additional sheets may be attached to show greater detail. Drawings shall be available at all times for inspection and shall be kept on the job at a location designated by the County.
3. Contractor at his option may use an additional set of drawings for daily field annotations. This set of drawings shall be kept at the site.
4. Final record drawings shall be submitted with floor numbers, room numbers, panel directories and all other identification necessary to conform to number designations for occupancy rather than to construction numbers. All buried conduit and/or underground conduits stubs intended for future extension shall be accurately shown as to depth and exact measurement from a permanently established landmark, such as building or structural features.

5. On completion, record drawings shall be signed, dated and returned to the County for inspection and approval before acceptance of any work.
6. Provide three (3) sets of drawings to Capital Projects Section and one (1) set to ISD Telecommunications Systems Engineer.

B. Final Submittal

Three (3) complete sets of the Final Submittal including a full set of the drawings on vellum shall be delivered to the Capital Projects Section and two (2) complete sets to the ISD Telecommunications Systems Engineer prior to acceptance tests and as a condition for final payment for the project to the contractor. It shall include all the information necessary to maintain each system, and shall consist of the following:

1. Operators Instructions (as applicable).
2. Factory-issued Service Manuals for each piece of equipment installed. The manuals shall contain complete parts lists, detailed schematics, circuit descriptions, maintenance procedures and trouble-shooting methods. In the event such manuals are not available from the factory, it shall be the responsibility of the contractor to compile and submit the required information.
3. A System Manual for each system furnished. This manual shall complement the above service manuals with all necessary additional information unique to the system that is not otherwise provided, such as a list of applicable service manuals, options selected, jumper or strapping choices, modifications, and detailed wiring information. All manuals shall be bound in a 3-ring binder with tabs identifying each system.
4. Record Drawings (see Paragraph 1.8A.5).
5. Two (2) electronic copies of all drawings in AutoCAD [latest version] shall be provided. [One copy to the Capital Project Section and one copy to the County ISD Telecommunications Systems Engineer.]

1.10 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. Prior to Owner acceptance, the contractor shall provide to Owner, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The Owner will only acknowledge acceptance upon submittal of a valid manufacturers warranty.

B. The warranty shall commence from the date of final written acceptance by the Owner.

C. All conditions for obtaining the manufacturers warranty shall be the sole responsibility of the contractor.

D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.

E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

1.11 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical

defects shall be replaced promptly at no expense to the Owner.

1.12 Qualifications

1. The bidder shall, prior to the bid, in accordance with the Instruction to Bidders, submit at least the following information to verify that the bidder has the necessary experience and qualifications to perform the specified work:

    a. A detailed brochure describing the bidder's capabilities in terms of facilities, personnel (include a personnel organization chart followed by resumes), experience, background, examples of similar installations (at least two projects within the past two years), distribution arrangements with manufacturers and financial capability, including certificates of insurance and satisfaction of the project bonding requirements.
    b. AIA Document A305 "Contractor's Qualification Statement".
    c. Information identifying any and all local agents and/or subcontractors that will assist in the work and their role in the project.
    d. Identification of sources of labor for all fabrication and installation throughout the duration of the project.
    e. Evidence that he has acquired all necessary licenses, certificates and approvals to perform the specified work within the state or jurisdiction the work is to be performed.

2. Digital Signal Processing (DSP) equipment requirements: Contractor shall submit evidence of qualification from the manufacturer of said equipment. This shall include completion of manufacturer's training courses, the name of the parson or persons who completed said training and prior projects completed using BSP technology. If the Contractor is not approved for the DSP programming, they must submit, for approval, information on the person or company that will provide this service.
3. Networked audio or video systems: Contractor shall submit the name of the person, in their employment, qualified to perform this work. This person shall have certification in computer network technology and hold one of the following certifications:

    a. CNP - Certified Network Professional Program.
    b. Computing Technology Industry Association - Network+ certification.
    c. MCSE - Microsoft Certified Systems Engineer.
    d. CNE - Certified Systems Engineer.
    e. CCNA - Cisco Certified Network Associate.

4. Software configurable, integrated central control systems: Contractor shall include and provide the services of an authorized programmer who is fully engaged in the work of programming. This person shall hold a CAlP - Crestron Authorized Independent Programmer.
5. The Contractor will provide information on how and by whom the requirements of the warranty period will be fulfilled.
6. The submittal must justify, in the judgment of the Consultant, the Architect, and the Owner, that the Contractor has the capability to manage and install a project of this size and scope and that he is capable of the necessary business and technical arrangements for this installation and the pursuant warranty service. Contractor may be disqualified as a bidder if all of the submittal does not meet the approval of the Owner and his/her representative.
7. Company: Work of this Section shall be performed by a Sound or Audiovisual Systems Contractor who has at least five years direct experience with the devices, equipment and systems of the type and scope specified herein, and who has a fully staffed and equipped

maintenance and repair facility, and who is licensed to perform work of this type in the Project jurisdiction. The company must be NSCA R-ESI or CTS certified.

8. Personnel: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section. Supervisors shall have at least five years direct experience in similar work. Installation and maintenance personnel shall have at least three years direct experience in similar work. Contractors shall have at least 60% of their installation staff CTS or C-EST certified.
9. Designated Supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the Project Site during all phases of installation and testing of the Work of this Section. This supervisor shall be the same individual throughout the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.
10. Staff Engineer: The Contractor shall have on his full-time payroll at least one staff engineer having five years minimum experience as an electronics engineer covering systems and projects comparable in substance and complexity to the project described herein. The staff engineer shall have NlCET certification in Electrical/Electronics Engineering Technology and Audio Systems or equivalent. The signature of that engineer shall appear on all shop drawings and submittals.
11. Coordination: Coordinate the Work of this Section with the Work of all other Separate Contracts. Comply with Division 1.

PART 2 – PRODUCTS

2.1 CABLE TELEVISION [CATV] DISTRIBUTION SYSTEM

A. System Description and Functional Requirements

1. The intent of the system is to provide CATV programming including local TV channels to the building. The system shall consist of a local cable TV company drop, internal coaxial cable, a distribution amplifier, splitters and CATV outlet drops as indicated on the plans. The communications vendor shall use pads as necessary to prevent overload of the signal.
2. The CATV system shall be grounded in accordance to the National Electric Code. The installation shall comply with All National Electric Codes, Building, and Fire Codes.
3. The Communications Contractor shall coordinate with the local cable company a location on the wall field to terminate a CATV drop into the building MCR room using the entrance provided to the building property line closest to the local cable company's feed line. The Communications Contractor shall coordinate with the local cable company to determine the requirements to interface the conduit to the cable company's feed . The Communications Contractor shall furnish and install the materials to interface the cable company's feed with the conduit.
4. The Communications Contractor shall furnish and install a CATV distribution amplifier in the MCR room. The Communications Contractor shall furnish and install internal coaxial cabling from the distribution amplifier and splitters to the TV outlets. Each TV outlet shall have an individual coaxial cable home run to the distribution amplifier. The CATV system shall have a minimum of ten (10) output ports to distribute the CATV signals to the TVs.
5. The Communications Contractor shall balance, amplify or pad the TV signals and ensure that each TV have a minimum of 5dBmv of CATV signal level at the TV input for all channels. The Communications Contractor shall ensure that all TVs shall display a clear picture for all channels. The Communications Contractor shall furnish and install all other materials not listed to deliver a fully functional CATV system.

B. Equipment and Materials

1. Distribution Amplifier – Pico Macom, INC. PIDA-1000, wall mounted (if necessary).
2. Attenuators/Equalizers – Pico Macom PIDA-AT series, PIDA – EQ series
3. Internal coaxial cable - WestPenn 25841
4. F Connectors – WestPenn CN-FS6PL2.
5. Panduit Wall Plate – CFPL3BLY
6. F Connector Module – CMFSRIWY
7. CAT6 Module – CJ688TGOR
8. Blank Module – CMBWH-Y

    a. Splitters – Pico Macom TSB series splitter

2.2 VIDEO DISPLAYS

A. System Description and Functional Requirements

1. The intent of the video displays are to display CATV video system programming and DVD programming on wall mounted televisions. The video display unit shall consist of a television with television wall mount bracket. The video display unit shall also include a CATV receiver box as required. The television shall be securely mounted and fastened to the wall mount bracket. The CATV receiver box shall be installed in a bracket below the television.
2. The video displays shall be installed at the locations as shown in the plans. The walls shall be reinforced to provide additional wall support for the video display units. The video display units shall be mounted at a height above the finished floor meeting ADA height requirements.
3. TV outlets shall be installed in the locations as shown on the plans. TV outlets shall be connected to the CATV video system. The TV outlets shall be installed a flush mount single gang box with a TV outlet faceplate. A ¾" inch conduit shall be installed from the TV outlet box and stubbed above the accessible ceiling area. The TV outlets shall be installed next to the video display units.
4. A double duplex 120VAC electrical outlet shall be installed next to each TV outlet. The electrical outlet shall be flush mounted in the wall.

B. Equipment and Materials

1. LCD 42" Television - LG 42LM6200, Panasonic Viera TC-l42E50, Sony Bravia KDL-42EX440, or approved equal
2. LCD wall mount – Peerless ST640
3. LCD wall mount w/articulating arm – Peerless SA740P
4. VCR/DVD wall mount shelf – Lowell Mfg FS18 - 14
5. TV outlet faceplate – Cal Rad 75-493-WH2.
6. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.

2.3 OVERHEAD PAGING SYSTEM [PA]

A. System Description and Functional Requirements

1. The intent of the system is to provide voice paging. The system will cover the entire Community Center area. The overhead paging system shall be configured with number of

zones as shown in the plans, plus All Call. All Call shall be configured to have the paging announcements made simultaneously to all zones. The system will originate through the telephone system. Requirements shall include:

2. The paging equipment shall have 600 ohm balanced input for connection to the telephone system.
3. All speaker assemblies shall include a back box, grill and line matching transformer. The speakers shall include a built-in, screwdriver adjustable volume control and be equipped with a 70-volt line-matching transformer set on one and one quarter (1.25) watt tap.
4. The paging system will be accessible from the telephone instruments to allow paging through the overhead speakers. The general paging equipment for the building shall be installed in the MCR and connected to the Cisco Voice over IP (VoIP) telephone system using an FXO Trunk from the voice gateway. The FXO circuit shall be placed on an RJ14 and terminated on the paging amplifier using an RJ14-to-Spade terminating cable.
5. The paging system shall be mounted on the designated plywood backboard as indicated on the plans. ISD shall provide the telephone connection at an interface block.
6. The amplifier shall be sized appropriately to support all speakers.
7. The speaker cables shall be shielded twisted one (1) pair, 16 AWG, and plenum (CMP) rated. The speaker cables shall be installed horizontally through the ceiling area in a neat and orderly fashion and supported by cable hangers at appropriate intervals. The speaker cables shall be positioned at least six (6) inches from telephone and data wires. The installation shall comply with ALL applicable National Electric Code, Building Safety, and Fire Codes. The Communications Contractor shall apply section 3.5.1 items a through d. with regard to the low voltage cabling for the overhead paging system.
8. The Communications Contractor and its subcontractors shall be an authorized manufacturer's distributor and a manufacturer's certified installer of the PA equipment. The contractor and subcontractors shall submit manufacturer's certification at the time of bid submittal.
9. The Public Address (PA) System shall be a 70 V system if approved by the Authority Having Jurisdiction (AHJ). Contractor shall verify with the AHJ that plenum speaker cabling can be installed without conduit using the amplifier 70V PA amplifier output. Contractor shall use the AHJ approved 25V output if AHJ does not approve 70V amplifier output using plenum cabling without conduit.
10. The Communications Contractor shall install the PA system in accordance with all Federal, State, and local building codes including but not limited to the National Electric Code (NEC).
11. The Communications Contractor shall be responsible for verifying site conditions and for furnishing the proper type and quantity of material.
12. The Communications Contractor shall repair, replace and reinstall any material damaged during the course of this project.
13. The Communications Contractor shall furnish and install any and all materials, whether or not specified, to provide a complete and fully functional Public Address System as intended. This includes but not limited to: wall mounted speakers, ceiling mounted speakers, speaker support brackets, cabling, all mounting and supporting materials, amplifiers, transformers, adapters, and telephone interface units.
14. The Communications Contractor shall install all material required in accordance with the manufacturer's instructions and specifications.
15. The Communications Contractor shall furnish, install, and connect the cabling from the speakers to the AHJ approved output of the amplifier.
16. The Communications Contactor shall install all speakers as shown on the plans and shall verify all speaker locations.
17. The Communications Contractor shall verify speaker locations and ceiling types with the County project manager and the general contractor. Some speakers may be mounted above the ceiling tiles/covering in certain areas. The Communications Contractor shall furnish and install

all appropriate materials to install the speakers in and above the various ceiling types. Contractor shall custom paint the speaker assemblies (enclosure, baffle, etc.) to match the color sample provided by the County.

18. The Communications Contractor shall furnish, install, and earthquake brace all speaker assemblies including speaker enclosures, speaker support brackets, cabling and associated materials.
19. The Communications Contractor shall cut the holes in the ceiling tiles where the speakers will be installed in the ceiling tiles and hard ceilings.
20. The Communications Contractor shall group a maximum of fifteen (15) speakers in any one cable run to the amplifier. The Communications Contractor shall furnish and install multiple cable runs for the speaker groups to the amplifier. Speakers shall be grouped by general location.
21. The Communications Contractor shall identify which speakers belong to which group on the cables and on the "As Built" drawings. The Communications Contractor shall also identify the cable runs on the "As built" drawings.
22. Cable runs shall be kept as short as possible.
23. The Communications Contractor shall install the cabling above the ceiling level. The Communications Contractor shall furnish and install cabling support and shall ensure that the cabling is supported independently from the supports used for the suspended ceiling and other systems above the ceiling.
24. The Communications Contractor shall furnish and install cabling support hardware for the cabling as per NEC.
25. Cabling shall not lie on the ceiling tiles or hard ceiling.
26. The Communications Contractor shall furnish and install the amplifier on the wall in the MCR room or equipment rack using appropriate rack mount hardware. The Communications Contractor shall refer to the drawings for amplifier location.
27. The Communications Contractor shall furnish and install the telephone interface equipment on the wall at the locations shown on the plans and securely fasten the telephone interface units to the wall. The Communications Contractor shall connect the zone outputs of the telephone interface unit to the respective zone speaker lines. The Communications Contractor shall furnish, install, and connect the PA amplifier to the telephone interface unit in accordance with the manufacturer's instructions for a multiple zone PA system.
28. The Communications Contractor shall furnish and install interface cabling between the telephone system and the PA system and terminate the cabling on the telephone system.
29. The Communications Contractor shall coordinate with the telephone system contractor to determine where to terminate the interface cabling on the telephone system and to obtain the telephone access code to the PA system.
30. The Communications Contractor shall connect the PA system to the telephone system at the location specified by the telephone contractor.
31. The Communications Contractor shall test the PA system through the telephone system with the access codes given by the telephone contractor.
32. The Communications Contractor shall balance the PA system when completed. The Communications Contractor shall adjust the audio levels of the PA system and audio sound levels of each speaker so that announcements can be heard distinctly and clearly above ambient noise levels during normal business activity in all areas.
33. The PA system shall not have any interference and/or unwanted audio noise including but not limited to buzz or hum noises. The contractor shall trouble shoot and eliminate any interference, feedback, and/or unwanted audio noise in the PA system.
34. The Communications Contactor shall reset the wattage of the speakers if it is determined that the sound level cannot be heard distinctly and clearly above the ambient noise level and adjust the speaker sound level and PA system sound level so that the announcements can be heard

distinctly and clearly above ambient noise level during normal business activity. The Communications Contractor shall reset the wattage and/or adjust the speaker volume control if it is determined that the speaker is too loud or too low in any area.

35. The Communications Contractor shall remove volume control knobs from the speakers so that the speaker volume control adjustment will be recessed.
36. The Communications Contractor shall furnish and install rack mounted UPS systems (UPS, batteries) and a rack mounted power distribution unit for the PA and telephone access equipment. UPS shall provide the equipment with a minimum of two hours of back up power to operate the equipment should there be an interruption of local power. The Communications Contractor shall connect the UPS units to AC power circuits. The Communications Contractor shall furnish and install hardware and brackets and earthquake brace UPS system and batteries to seismic 4 rating.

B. Equipment and Materials

1. Amplifiers – Solid State, Bogen TPU or GS series sized to accommodate all speakers in the PA system and 20% minimum of additional output power.
2. Telephone paging interface unit – Bogen PCM-2000 system including PCM-CPU, PCM-TIM and PCM-ZPM
3. Power supplies – Bogen PCM - PS
4. Speaker – 8”, 8 ohm, with 25/70 volt transformer and recessed volume control, Quam model C5/BU/W/VC.
5. Speaker enclosure – Quam model ERD 8 series.
6. Ceiling mounting bracket (suspended ceilings) – Quam model SSB-2.
7. Ceiling mounting bracket (hard lid ceilings) – Quam model SSB-7.
8. Speaker cable – shielded twisted pair AWG #16, plenum (CMP) rated. – WestPenn 25294B
9. Uninterruptible Power Supply (UPS) – APC for 2 hours back-up power.
10. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.

2.4 BUILDING A - EXERCISE ROOMS A103/A104/A105

A. System Description and Functional Requirements

1. The A/V systems shall be utilized for presenting, viewing and listening to multimedia presentations and cable/satellite broadcasts as well as a public address system. The system shall utilize/integrate DVD/VCR, Cable, Blu-ray, computer, microphone, and other inputs for output to LCD projectors, Television Monitors, and sound reinforcing systems. The AV system shall be controlled by a touch panel control system. The control system shall be able to control the functions of the AV equipment, audio volume, and projection screen. The AV system shall be integrated into lighting control systems, if required on plans. The AV system shall interface with the Fire alarm system and Emergency paging such the fire alarm system or emergency page overrides the AV sound reinforcement system during fire alarm activation or emergency page. See AV drawings for more detailed information regarding specific system functionality. The Public Address system shall consist of a audio processor with built in audio components including mixer, compressor/limiter/gate unit, and equalizer. The Public Address system shall also include feedback processor, amplifier, two (2) hand held wired microphones, two(2) handheld wireless microphones, two (2) wireless lavalier microphones, two (2) microphone floor stands, microphone cabling, connectors, wall plates, ceiling speakers, and a assistive listening system.
2. The A/V system shall provide clear, natural sound uniformly distributed throughout the

designated areas. The system shall utilize speakers as shown on the Plans. These quantities shall be considered as the minimum quantity required. If additional speakers are needed to meet the requirements specified below, the contractor shall include all costs for added speakers in the base bid. The AV system shall also be able to display High Definition video resolution without any video distortion.

3. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Electronic equalization shall be employed to insure smooth frequency response and high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and transients.
4. The system frequency response, shall be within + - 2dB from a curve which is flat from 80Hz to 4kHz and decreasing 3dB per octave from a relative level of 0 dB from 4kHz to 10kHZ. There shall be a minimum 12dB roll-off above 10 kHz and below 63 Hz. Uniformity of coverage of the system at seated ear height (42") shall be within + - 3dB in the 4kHz 1/3 octave band at any seat location using pink noise as a test signal.
5. System noise shall not exceed an equivalent input noise of -120dB based on a 20KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.
6. The sound level capability of program material levels produced in all seats shall be at least 90dB when measured with a scale filter. There shall be at least 6dB of amplifier headroom. When driven to maximum output, clipping shall first occur in the power amplifier.
7. The system shall provide clear audio to all areas covered by the system. Each zone shall be wired discretely to the correct zone on the AMP. See A/V drawings for exact location. A wall mounted selector switch will enable sound to be played in 2 or more zones simultaneously.
8. A presentation system shall be installed in the meeting room. The audio video equipment shall consist of a DVD/VCR combination unit, Blu-ray DVD Player, AM/FM tuner, AM/FM antenna, CD Player/Recorder, Audio/Video Matrix Switcher, HDMI switcher, touch panel audio/video control system, County provided computer, wireless keyboard, wireless mouse, multimedia audio/video input wall plate, CATV receiver, equipment rack, amplifier, and speakers. The multimedia audio/video input wall plate shall have inputs to accommodate for HDMI, VGA, composite video, S-Video and corresponding audio signals.
9. With the exception of the multimedia audio/video wall plate, wireless keyboard, wireless mouse, and speakers, AM/FM antenna, wireless audio/video touch panel, and the assistive listening emitter panel, the equipment shall be rack mounted in the equipment rack located in the audio control room.
10. The presentation system shall provide audio, video, and data signals to be displayed on the projection screen and heard through the speakers.
11. An audio/video matrix switcher and HDMI switcher shall be installed to select between the sources to be displayed on the projection screen via the projector and selected the audio source to be heard through the speakers.
12. Touch panel control system shall be installed to control the functions of the projector, projector lift, projector screen, DVD/ VCR combination unit, Blu-ray DVD player, CD player/recorder, audio/video matrix switcher, HDMI switcher, screen and audio processors, AM/FM tuner, and CATV receiver box. The control system shall be able to control the audio volume levels of the meeting room PA and presentation systems. The touch panel control system shall be able to control the power on/off functions for all of the audio/video equipment. The control touch panels shall select the audio, video and computer source to be displayed and heard on the presentation system. A wireless control touch panel with docking station shall be installed and wall mounted in the meeting room. The Communications Contractor shall configure and program all hardware and software for the control touch panels, control system, and audio/video switcher, HDMI switcher, and all other hardware and software associated

with the meeting room audio video system. All programming data, configuration, and application software shall become the sole property of the County for the County's use. The Communications Contractor shall provide two copies to the County all programming data, configuration, and programming application software on CD/DVDs.

13. The presentation system shall be configured so that the audio from the meeting room public address system can be recorded on the CD recorder.
14. A second, hard wired control touch panel, shall be installed in the equipment rack and have the same capabilities as the wireless control touch panel to control the Meeting room audio/video systems. A release button shall be configured on the hardwired touch panel to release the wireless touch panel from the docking station. The wireless touch panel shall be fully functional controlling the audio/video system while in the docking station.
15. A preview monitor shall be installed in the rack to view the selected video programming.
16. The speakers shall be wall mounted on either side of the projection screen.
17. A CATV drop and receiver box as necessary shall be installed from the CATV system in the MCR room and installed in the equipment rack. The TV drop shall be integrated into the audio/video system to be displayed in the meeting room over the presentation system.
18. A multimedia audio/video wall plate shall be installed at the front of the meeting room and also at the rear of the meeting room. The various audio/video connectors shall be connected to separate individual inputs of the audio/video switcher and HDMI switcher, to be selected as an individual audio/video source.
19. The Communications Contractor shall furnish and install a AM/FM antenna on the roof of the building. The Communications contractor shall furnish and install RG 6 or larger coax cabling from the AM/FM antenna to the AM/FM tuner and connect the antenna to the tuner. The Communications contractor shall ground the antenna and cabling according to NEC codes.
20. The equipment rack shall be installed and earthquake braced at the top and bottom of the rack. The equipment rack shall be grounded. The equipment rack shall have a vented top panel. The equipment rack shall have a power strip with surge suppression and circuit breaker. All blank rack spaces shall be covered with black vented panels.
21. The Communications Contractor shall furnish and install a laminated "as built" drawing of the wiring diagram for the presentation, public address, and video conferencing systems in the meeting room. The drawing shall be 36"W x 24" H. The drawing shall show all components of the presentation, public address, and video conferencing systems and their interconnects. The drawing shall be installed and mounted on the wall in the audio/video control room.

B. Equipment and Materials

The system shall utilize AV products as shown on the Plans and listed below. These products shall be considered to be the minimum quantity, performance, functionality and quality levels. If additional and/or upgraded components are needed to meet the performance requirements of this design-build specification, the contractor shall include all costs for such added and/or upgraded components in the base bid.

1. DVD/VCR Combination unit – JVC DR-MV150B
2. Blu-ray DVD player – Sony BDP-S590. Output to include HDMI.
3. CD Player/recorder – Tascam CD-RW901SL
4. Wallplate Multimedia Audio/Video/VGA/HDMI extender wall plate transmitter – Extron MTP/HDMI UTAD
5. Multimedia Audio/Video/VGA/HDMI extender receiver (for wallplate transmitters) – Extron MTP/HDMI UR
6. Floorbox Multimedia Audio/Video extender - Crestron DM-200-2G or equal.
7. Multimedia Audio/Video receiver (for floorbox transmitters)- Crestron DM-RMC-100 or

equal.

8. Cabling and connectors – All required cables and connectors to furnish and install a complete and fully functional system.
9. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.
10. CD/MP3 player shall be Denon DN-C550R.
11. ADA-Compliant Wireless Infrared Assistive Listening System:

    a. A complete system shall be furnished and installed to meet the ADA requirements for hard-of-hearing for each system. Furnish wireless infrared portable receivers in numbers equal to 4% of the seating with a minimum of one portable receiver (divisible or partitionable rooms shall be provided with a minimum of one portable receiver per portioned space).
    b. The ADA-Compliant Wireless Infrared Assistive Listening System shall be integrated into and work in conjunction with the sound reinforcement systems.
    c. Provide an IR transmitter/IR emitter in each partitionable space with line-of-sight wireless infrared access to the IR emitter from IR receivers at any location in that space: one IR transmitter/IR emitter shall be provided in Room B103, one IR transmitter/IR emitter shall be provided in Room B104, and one IR transmitter/IR emitter shall be provided in Room B105.
    d. Mount the necessary stationary transmitters into the equipment racks interconnected with the corresponding emitter mounted in the the MPR rooms, adjust as required for total coverage of seating areas. Contractor shall include all costs to tune transmitters and receivers to avoid interference from other IR sources. The Assistive Listening System shall use infrared (IR) light to transmit audio from IR emitting radiators to portable IR receivers. The system shall use IR modulating frequencies above 2.0 MHz. The system transmitter shall have a timer that shuts off the carriers after 30 minutes when no audio is present at the transmitter. Channel selection shall be capable of being locked. The system shall be capable of transmitting on four (4) carriers and each of the four (4) carriers shall be capable of transmitting a mono or stereo signal. The system shall have a frequency response of 100 to 15 KHz (+/-3 dB), less than 2% distortion and shall have signal to ratio of greater than 60 dB. A single emitting radiator shall have a transmitting area of no less than 10,000 ft^2 (929 m^2) (one carrier) or greater for each radiator.
    e. The receivers will be powered by NiMH rechargeable battery packs and include a compact charging station.
    f. Listen Technologies, Williams Sound, or Approved Equal.

12. Wireless Assisted Listening System:

    a. Sennheiser system, including SZI 1015-T/NT emitter panel, WM1 emitter panel wall mount bracket, L151-10 and NT92-120 Battery Charger, RI250 headset receivers, and BA151 spare batteries. Color to be determined by Owner.
    b. The Wireless Sound System for Assisted Listening shall be integrated into and work in conjunction with the sound reinforcement systems.
    c. Provide an IR transmitter/IR emitter in each partitionable space with line-of-sight wireless infrared access to the IR emitter from IR receivers at any location in that space: one IR transmitter/IR emitter shall be provided in Room B103, one IR transmitter/IR emitter shall be provided in Room B104, and one IR transmitter/IR emitter shall be provided in Room B105.

d. Mount the necessary stationary transmitters into the equipment racks interconnected with the corresponding emitter mounted in the the MPR rooms, adjust as required for total coverage of seating areas. Contractor shall include all costs to tune transmitters and receivers to avoid interference from other IR sources. The Assistive Listening System shall use infrared (IR) light to transmit audio from IR emitting radiators to portable IR receivers.

13. Loudspeakers - Electrovoice EVID C8.2 2-way or approved equal.

    a. Include back can, grille, tile rails, and all necessary mounting hardware. Verify grille color with architect prior to ordering. Grilles shall be painted to match ceiling color where necessary.
    b. All loudspeakers are to be adjusted to have the same sound pressure level (SPL), plus or minus two db at four feet above the floor regardless the mounting height.

14. Touch panel control panels for Multipurpose Room B103, B0104, and B105 shall be Crestron TPS-6L or equal. Provide BB-6L or equal backbox to E.C. for installation in wall.
15. Processor - Crestron Pro 2 or equal with Crestron C2NET-1 interface card and C2N-HBLOCK Distribution Block.
16. Digital Switcher - Crestron DM-MD16X16 or equal with DMC-CAT-DSP, DMC-VID-RCA-A, DMC-HD-DSP input cards as required.
17. Output cards for the Switcher - Crestron DMCO-33 and DMCO-22 or equal as required.
18. Media Receiver [at Projector] - Crestron DM-RMC-100 or equal.
19. Remote source input plate - Crestron DM-200-2G or equal.
20. Input plates for audio wired mic sources - Extron CMP101 and MAAP 70-296-13 or equal.
21. Audiovisual LAN Edge Switch - Provide Ethernet switch in AV rack by Cisco or HP.

    a. Switch to have (2) spare ports for uplink to owner's network.
    b. Uplink data cables to IDF by Structured Cabling (SCS) contractor.
    c. Provide all patch cables as required.

22. Projector - Mitsubishi UD8400U with appropriate Lens.
23. Projection Screen - Draper Signature/Series V with M1300 surface
24. Projector Mount - Mount projector to ceiling structure above acoustical ceiling with Chief RPA-173 projector mount, Premier Mounts PP-5A, and 1-1/2" diameter NTP pipe with threaded ends (to length as required).
25. Motorized projection screen and wall switch - Installed by E.C. AV Contractor to connect low voltage control to AV system for control from touch panel.
26. Audio Amplifiers - QSC CX302 with IT – 42 Transformer, or approved equal.
27. Digital Signal Processor - Biamp Audiaflex with IP2 and AEC-2HD input cards and OP2e output cards as required.
28. Wireless Microphone System - Shure ULX Wireless. Wireless microphone UR124S/BETA58, Shure lavalier mic with body pack UR1-SCB6B, and Shure wireless receiver UA845-SWB and Shure directional antenna UA870USTV.
29. Wired Microphones - Shure SM58-CN.
30. Provide all plenum rated cables for a complete and operable system. Provide all patch cables to include spares for owner provided equipment for a complete and operable system.
31. HD Cable Tuners - AVermedia TVbox 11 with remote control and power supply.
32. Audiovisual Equipment Rack System - Amplifiers and control equipment shall be housed in a floor mounted equipment rack:

a. Include all rack mounting kits and power strips as required for complete installation of all equipment.
b. Middle Atlantic full height Middle Atlantic WRK-44SA-32 with vented top and power strip. Include USC-6R Power Sequencer, MPR-6 Raceway, and RLM-20 power modules as required.
c. Input power to be hardwired by E.C..

33. Analog/Digital Tuner - Aurora V-Tune-PROHD.
34. CD Player/recorder - Alesis ML9600, or approved equal.
35. AM/FM Tuner shall be Tascam TU-690, or approved equal.
36. AM/FM Antenna kit shall be Pixel Technologies AFHD-4
37. Video scaler shall be Extron DVS304.
38. Preview Monitor shall be Marshall V-R151DP-AFHD, or approved equal.
39. Wireless Keyboard/Mouse suite - Gyration GP3200-001, or approved equal.
40. Cabling and connectors – Provide all required cables and connectors to furnish and install a complete and fully functional system.
41. Miscellaneous materials – Provide all materials necessary to furnish and install a complete and fully functional system.

2.5 BUILDING A – MEETING ROOM A116

A. System Description and Functional Requirements

1. The Meeting Room A116 audiovisual system shall be utilized for presenting, viewing and listening to multimedia presentations and cable broadcasts, including the incorporated videoconferencing system specified under Paragraph C below. The system shall utilize/integrate DVD/VCR, Cable, Blu-ray, computer, and other inputs for output to wall-mounted flat-panel video display and sound reinforcing systems. The AV system shall be controlled by a touch panel control system. The control system shall be able to control the functions of the AV equipment, audio volume, video display, and the video conferencing system. The AV system shall be integrated into lighting control systems, if required on plans.
2. The A/V system shall provide clear, natural sound uniformly distributed in the meeting room. The system shall utilize speakers as shown on the Plans. The AV system shall also be able to display High Definition video resolution without any video distortion.
3. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Electronic equalization shall be employed to insure smooth frequency response and high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and transients.
4. The system frequency response, shall be within + - 2dB from a curve which is flat from 80Hz to 4kHz and decreasing 3dB per octave from a relative level of 0 dB from 4kHz to 10kHZ. There shall be a minimum 12dB roll-off above 10 kHz and below 63 Hz. Uniformity of coverage of the system at seated ear height (42") shall be within + - 3dB in the 4kHz 1/3 octave band at any seat location using pink noise as a test signal.
5. System noise shall not exceed an equivalent input noise of -120dB based on a 20KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.
6. The sound level capability of program material levels produced in all seats shall be at least 90dB when measured with a scale filter. There shall be at least 6dB of amplifier headroom. When driven to maximum output, clipping shall first occur in the power amplifier.
7. A presentation system shall be installed in the meeting room. The audio video equipment shall

consist of a DVD/VCR combination unit, Blu-ray DVD Player, CD Player/Recorder, Audio/Video Matrix Switcher, HDMI switcher, touch panel audio/video control system, Owner-provided computer, wireless keyboard, wireless mouse, multimedia audio/video input wall plate, CATV receiver, equipment rack, amplifier, and speakers. The multimedia audio/video input wall plate shall have inputs to accommodate for HDMI, VGA, composite video, S-Video and corresponding audio signals.

8. With the exception of the multimedia audio/video wall plates and table top box-housed connectivity panels, ceiling speakers, and audio/video touch panel, the equipment shall be rack mounted in the equipment rack located in the shelf space under the counter at the front of the room.
9. The presentation system shall provide audio, video, and data signals to be displayed on the video display and heard through the speakers.
10. An audio/video matrix switcher and HDMI switcher shall be installed to select between the sources to be displayed on the video display and selected the audio source to be heard through the speakers.
11. Touch panel control system shall be installed to control the functions of the video display, DVD/ VCR combination unit, Blu-ray DVD player, CD player/recorder, audio/video matrix switcher, HDMI switcher, screen and audio processors, and CATV receiver box. The control system shall be able to control the audio volume levels of the meeting room PA and presentation systems. The touch panel control system shall be able to control the power on/off functions for all of the audio/video equipment. The control touch panels shall select the audio, video and computer source to be displayed and heard on the presentation system. The Communications Contractor shall configure and program all hardware and software for the control touch panels, control system, and audio/video switcher, HDMI switcher, and all other hardware and software associated with the meeting room audiovisual system. All programming data, configuration, and application software shall become the sole property of the County for the County's use. The Communications Contractor shall provide two copies to the County all programming data, configuration, and programming application software on CD/DVDs.
12. The presentation system shall be configured so that the audio from the meeting room audio system can be recorded on the CD recorder.
13. A CATV drop and receiver box as necessary shall be installed from the CATV system in the meeting room and installed in the equipment rack. The TV drop shall be integrated into the audio/video system to be displayed in the meeting room over the presentation system.
14. A multimedia audio/video wall plate shall be installed at the front of the meeting room and also in the meeting room conference table. The various audio/video connectors shall be connected to separate individual inputs of the audio/video switcher and HDMI switcher, to be selected as an individual audio/video source.
15. The equipment rack shall be installed under the front counter as shown in the plans, and shall be earthquake braced at the top and bottom of the rack. The equipment rack shall be grounded. The equipment rack shall have a vented front panel. The equipment rack shall have a power strip with surge suppression and circuit breaker. All blank rack spaces shall be covered with black vented panels.

B. Equipment and Materials

The system shall utilize AV products as shown on the Plans and listed below. These products shall be considered to be the minimum quantity, performance, functionality and quality levels. If additional and/or upgraded components are needed to meet the performance requirements of this design-build specification, the contractor shall include all costs for such added and/or upgraded components in the base bid.

1. LCD 42" Television – LG 42LM6200, Panasonic Viera TC-L42E50, Sony Bravia KDL-42EX440, or approved equal.
2. LCD Wall Mount – Peerless ST640.
3. VCR/DVD Wall Mount Shelf – Lowell Mfg FS18-14.
4. TV Tuner – Avermedia TVBox 11 with remote control and power supply.
5. TV Outlet Faceplate – Cal RAD 75-493-WH2.
6. DVD/VCR Combination Unit – JVC DR-MV150B.
7. Stereo Amplifier, 210W – Crestron AMP-2210S.
8. Tabletop Kit for TSW-750 – Crestron TSW-750-TTK.
9. VGA and Audio Pass-Thru Plate – Crestron MP-WP130.
10. LAN Pass-Thru Plate – Crestron MP-WP183.
11. HDMI Pass-Thru Plate – Crestron MP-WP152.
12. Video Scaler with VGA and HDMI – Crestron HD-SCALER.
13. Touchscreen Control Panel, 7-Inch POE – Crestron TSW-750.
14. HD Video Conferencing Codec – Polycom HDX-8000.
15. AV Matrix Switcher with Amplifier, Digital Media – Crestron DMPS-300-C.
16. Ceiling Speakers, 6.5-Inch – Crestron Saros IC6T.
17. Flip Top Cable Pass-Thru Box – Crestron FT-PWR-D-LG.
18. Transmitter, Digital Media – Crestron DM-TX-201-C.
19. Cabling – Crestron VGA, RGBHV, HDMI, S-Video, and control cabling as required (all plenum-rated).
20. Connectors – Extron, as required.
21. Power Supplies/Wiring – As required for above equipment and devices.
22. Blu-ray DVD Player – Sony BDP-S590; output to include HDMI.
23. CD Player/Recorder – Tascam CD-RW901SL, or approved equal.
24. CD/MP3 Player – Denon DN-C550R, or approved equal.
25. CD Player/Recorder – Alesis ML9600, or approved equal.
26. Cabling and connectors – All required cables and connectors to furnish and install a complete and fully functional system.
27. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.

C. Video Conferencing System for Meeting Room A116

1. System Description and Functional Requirements

   a. The intent of the system is to provide a video conferencing system in the Meeting Room A116 incorporated into and integrated with the meeting room's audiovisual system. The video conferencing system shall have audio and video communication with data collaboration software and hardware. The videoconferencing system shall include a codec, quad BRI module, Quad NT1, camera, microphones, built-in AES encryption, and data collaboration hardware and software. The videoconferencing audio and video signals shall be integrated with the Meeting room audio/video systems. The video/PC display shall be projected on to the meeting room screen. The audio shall be distributed via the Meeting room sound system.
   b. The video conferencing system shall be capable of communication over four (4) dual channel ISDN BRI circuits (8 circuits total) and over an IP network.. The County preference is utilizing the IP network for communication. The system shall be capable of communications from 64 kbps to 2Mbps speeds. The video conferencing system shall be

H.264. H.323, and H.320 compliant. The microphones shall be installed on the tables. The codec, quad BRI modules, NT1, and IP connectivity shall be installed in the audio/video control room. Four (4) dual channels ISDN BRI circuits (8 circuits total) and one data jack with RJ 45 jack shall be installed in the audio/video control room for video conferencing system use. The circuits shall be labeled with the phone and SPID numbers for each circuit. The data jack shall be labeled in accordance with standard data jack procedures.

c. The videoconferencing system shall be integrated with the Meeting Room audio/video system. The Meeting room sound system shall be used for the audio input and outputs of the codec. The Communications Contractor shall furnish and install a audio processor to integrate the Meeting Room audio system with the videoconferencing system. The Meeting Room projector shall display the video output of the codec. The camera shall be mounted on the wall. Location of the camera shall be determined by the County Project Manager. The Communications Contractor shall connect the PC and VCR/DVD outputs of the audio/video system to the PC and VCR/DVD inputs of the codec. The Communications Contractor shall program and configure all settings and parameters of the codec. The Communications Contractor shall furnish and install a remote camera kit to transmit the video, control, and power signals over Cat6 cabling to the codec. The videoconference system shall be controlled via a hand held remote control unit and the touch panel control system. The touch panel control system shall be programmed and configured to have the same functions and operation as the hand held remote control unit. The Communications Contractor shall work with County network engineers to incorporate the videoconference traffic into the County LAN/WAN data network. The Communications Contractor shall furnish and install all other materials not listed or specified to deliver a fully functional videoconferencing system.

2. Equipment and Materials

a. Videoconferencing system – Polycom HDX8000System including Eagle Eye 720p camera and People + Content license package.
b. Manufacturers Support package – Polycom Premier Support services for 1 year.
c. Codec PC input cable – Polycom DVI to VGA cable
d. BRI module – Polycom quad BRI module
e. NT1 unit – Adtran NT1 ACE 4
f. Remote camera control unit – Sound Control Technology RC2-HDP
g. Cat 6 plenum cabling – General cable 6131278
h. Audio processor – Biamp Nexia VC
i. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.

2.6 BUILDING B - MULTI-PURPOSE ROOMS B103/B104/B105

A. System Description and Functional Requirements

1. The A/V systems shall be utilized for presenting, viewing and listening to multimedia presentations and cable/satellite broadcasts as well as a public address system. The system shall utilize/integrate DVD/VCR, Cable, Blu-ray, computer, microphone, and other inputs for output to LCD projectors, Television Monitors, and sound reinforcing systems. The AV system shall be controlled by a touch panel control system. The control system shall be able to control the functions of the AV equipment, audio volume, and projection screen. The AV system shall be integrated into lighting control systems, if required on plans. The AV system

shall interface with the Fire alarm system and Emergency paging such the fire alarm system or emergency page overrides the AV sound reinforcement system during fire alarm activation or emergency page. See AV drawings for more detailed information regarding specific system functionality. The Public Address system shall consist of a audio processor with built in audio components including mixer, compressor/limiter/gate unit, and equalizer. The Public Address system shall also include feedback processor, amplifier, two (2) hand held wired microphones, two(2) handheld wireless microphones, two (2) wireless lavalier microphones, two (2) microphone floor stands, microphone cabling, connectors, wall plates, ceiling speakers, and a assistive listening system.

2. The A/V system shall provide clear, natural sound uniformly distributed throughout the designated areas. The system shall utilize speakers as shown on the Plans. These quantities shall be considered as the minimum quantity required. If additional speakers are needed to meet the requirements specified below, the contractor shall include all costs for added speakers in the base bid. The AV system shall also be able to display High Definition video resolution without any video distortion.
3. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Electronic equalization shall be employed to insure smooth frequency response and high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and transients.
4. The system frequency response, shall be within + - 2dB from a curve which is flat from 80Hz to 4kHz and decreasing 3dB per octave from a relative level of 0 dB from 4kHz to 10kHZ. There shall be a minimum 12dB roll-off above 10 kHz and below 63 Hz. Uniformity of coverage of the system at seated ear height (42") shall be within + - 3dB in the 4kHz 1/3 octave band at any seat location using pink noise as a test signal.
5. System noise shall not exceed an equivalent input noise of -120dB based on a 20KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.
6. The sound level capability of program material levels produced in all seats shall be at least 90dB when measured with a scale filter. There shall be at least 6dB of amplifier headroom. When driven to maximum output, clipping shall first occur in the power amplifier.
7. The system shall provide clear audio to all areas covered by the system. Each zone shall be wired discretely to the correct zone on the AMP. See A/V drawings for exact location. A wall mounted selector switch will enable sound to be played in 2 or more zones simultaneously.
8. A presentation system shall be installed in the meeting room. The audio video equipment shall consist of a DVD/VCR combination unit, Blu-ray DVD Player, AM/FM tuner, AM/FM antenna, CD Player/Recorder, Audio/Video Matrix Switcher, HDMI switcher, touch panel audio/video control system, County provided computer, wireless keyboard, wireless mouse, multimedia audio/video input wall plate, CATV receiver, equipment rack, amplifier, and speakers. The multimedia audio/video input wall plate shall have inputs to accommodate for HDMI, VGA, composite video, S-Video and corresponding audio signals.
9. With the exception of the multimedia audio/video wall plate, wireless keyboard, wireless mouse, and speakers, AM/FM antenna, wireless audio/video touch panel, and the assistive listening emitter panel, the equipment shall be rack mounted in the equipment rack located in the audio control room.
10. The presentation system shall provide audio, video, and data signals to be displayed on the projection screen and heard through the speakers.
11. An audio/video matrix switcher and HDMI switcher shall be installed to select between the sources to be displayed on the projection screen via the projector and selected the audio source to be heard through the speakers.
12. Touch panel control system shall be installed to control the functions of the projector,

projector lift, projector screen, DVD/ VCR combination unit, Blu-ray DVD player, CD player/recorder, audio/video matrix switcher, HDMI switcher, screen and audio processors, AM/FM tuner, and CATV receiver box. The control system shall be able to control the audio volume levels of the meeting room PA and presentation systems. The touch panel control system shall be able to control the power on/off functions for all of the audio/video equipment. The control touch panels shall select the audio, video and computer source to be displayed and heard on the presentation system. A wireless control touch panel with docking station shall be installed and wall mounted in the meeting room. The Communications Contractor shall configure and program all hardware and software for the control touch panels, control system, and audio/video switcher, HDMI switcher, and all other hardware and software associated with the meeting room audio video system. All programming data, configuration, and application software shall become the sole property of the County for the County's use. The Communications Contractor shall provide two copies to the County all programming data, configuration, and programming application software on CD/DVDs.

13. The presentation system shall be configured so that the audio from the meeting room public address system can be recorded on the CD recorder.
14. A second, hard wired control touch panel, shall be installed in the equipment rack and have the same capabilities as the wireless control touch panel to control the Meeting room audio/video systems. A release button shall be configured on the hardwired touch panel to release the wireless touch panel from the docking station. The wireless touch panel shall be fully functional controlling the audio/video system while in the docking station.
15. A review monitor shall be installed in the rack to view the selected video programming.
16. The speakers shall be wall mounted on either side of the projection screen.
17. A CATV drop and receiver box as necessary shall be installed from the CATV system in the MCR room and installed in the equipment rack. The TV drop shall be integrated into the audio/video system to be displayed in the meeting room over the presentation system.
18. A multimedia audio/video wall plate shall be installed at the front of the meeting room and also at the rear of the meeting room. The various audio/video connectors shall be connected to separate individual inputs of the audio/video switcher and HDMI switcher, to be selected as an individual audio/video source.
19. The Communications Contractor shall furnish and install a AM/FM antenna on the roof of the building. The Communications contractor shall furnish and install RG 6 or larger coax cabling from the AM/FM antenna to the AM/FM tuner and connect the antenna to the tuner. The Communications contractor shall ground the antenna and cabling according to NEC codes.
20. The equipment rack shall be installed and earthquake braced at the top and bottom of the rack. The equipment rack shall be grounded. The equipment rack shall have a vented top panel. The equipment rack shall have a power strip with surge suppression and circuit breaker. All blank rack spaces shall be covered with black vented panels.
21. The Communications Contractor shall furnish and install a laminated "as built" drawing of the wiring diagram for the presentation, public address, and video conferencing systems in the meeting room. The drawing shall be 36"W x 24" H. The drawing shall show all components of the presentation, public address, and video conferencing systems and their interconnects. The drawing shall be installed and mounted on the wall in the audio/video control room.

B. Equipment and Material

The system shall utilize AV products as shown on the Plans and listed below. These products shall be considered to be the minimum quantity, performance, functionality and quality levels. If additional and/or upgraded components are needed to meet the performance requirements of this design-build specification, the contractor shall include all costs for such added and/or upgraded

components in the base bid.

1. DVD/VCR Combination unit – JVC DR-MV150B
2. Blu-ray DVD player – Sony BDP-S590. Output to include HDMI.
3. CD Player/recorder – Tascam CD-RW901SL
4. Wallplate Multimedia Audio/Video/VGA/HDMI extender wall plate transmitter – Extron MTP/HDMI UTAD
5. Multimedia Audio/Video/VGA/HDMI extender receiver (for wallplate transmitters) – Extron MTP/HDMI UR
6. Floorbox Multimedia Audio/Video extender - Crestron DM-200-2G or equal.
7. Multimedia Audio/Video receiver (for floorbox transmitters)- Crestron DM-RMC-100 or equal.
8. Cabling and connectors – All required cables and connectors to furnish and install a complete and fully functional system.
9. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.
10. CD/MP3 player shall be Denon DN-C550R.
11. ADA-Compliant Wireless Infrared Assistive Listening System:

    a. A complete system shall be furnished and installed to meet the ADA requirements for hard-of-hearing for each system. Furnish wireless infrared portable receivers in numbers equal to 4% of the seating with a minimum of one portable receiver (divisible or partitionable rooms shall be provided with a minimum of one portable receiver per portioned space).
    b. The ADA-Compliant Wireless Infrared Assistive Listening System shall be integrated into and work in conjunction with the sound reinforcement systems.
    c. Provide an IR transmitter/IR emitter in each partitionable space with line-of-sight wireless infrared access to the IR emitter from IR receivers at any location in that space: one IR transmitter/IR emitter shall be provided in Room B103, one IR transmitter/IR emitter shall be provided in Room B104, and one IR transmitter/IR emitter shall be provided in Room B105.
    d. Mount the necessary stationary transmitters into the equipment racks interconnected with the corresponding emitter mounted in the the MPR rooms, adjust as required for total coverage of seating areas. Contractor shall include all costs to tune transmitters and receivers to avoid interference from other IR sources. The Assistive Listening System shall use infrared (IR) light to transmit audio from IR emitting radiators to portable IR receivers. The system shall use IR modulating frequencies above 2.0 MHz. The system transmitter shall have a timer that shuts off the carriers after 30 minutes when no audio is present at the transmitter. Channel selection shall be capable of being locked. The system shall be capable of transmitting on four (4) carriers and each of the four (4) carriers shall be capable of transmitting a mono or stereo signal. The system shall have a frequency response of 100 to 15 KHz (+/-3 dB), less than 2% distortion and shall have signal to ratio of greater than 60 dB. A single emitting radiator shall have a transmitting area of no less than 10,000 ft^2 (929 m^2) (one carrier) or greater for each radiator.
    e. The receivers will be powered by NiMH rechargeable battery packs and include a compact charging station.
    f. Listen Technologies, Williams Sound, or Approved Equal.

12. Wireless Assisted Listening System:

    a. Sennheiser system, including SZI 1015-T/NT emitter panel, WM1 emitter panel wall

mount bracket, L151-10 and NT92-120 Battery Charger, RI250 headset receivers, and BA151 spare batteries. Color to be determined by Owner.

b. The Wireless Sound System for Assisted Listening shall be integrated into and work in conjunction with the sound reinforcement systems.
c. Provide an IR transmitter/IR emitter in each partitionable space with line-of-sight wireless infrared access to the IR emitter from IR receivers at any location in that space: one IR transmitter/IR emitter shall be provided in Room B103, one IR transmitter/IR emitter shall be provided in Room B104, and one IR transmitter/IR emitter shall be provided in Room B105.
d. Mount the necessary stationary transmitters into the equipment racks interconnected with the corresponding emitter mounted in the the MPR rooms, adjust as required for total coverage of seating areas. Contractor shall include all costs to tune transmitters and receivers to avoid interference from other IR sources. The Assistive Listening System shall use infrared (IR) light to transmit audio from IR emitting radiators to portable IR receivers.

13. Loudspeakers - Electrovoice EVID C8.2 2-way or approved equal.

    a. Include back can, grille, tile rails, and all necessary mounting hardware. Verify grille color with architect prior to ordering. Grilles shall be painted to match ceiling color where necessary.
    b. All loudspeakers are to be adjusted to have the same sound pressure level (SPL), plus or minus two db at four feet above the floor regardless the mounting height.

14. Touch panel control panels for Multipurpose Room B103, B0104, and B105 shall be Crestron TPS-6L or equal. Provide BB-6L or equal backbox to E.C. for installation in wall.
15. Processor - Crestron Pro 2 or equal with Crestron C2NET-1 interface card and C2N-HBLOCK Distribution Block.
16. Digital Switcher - Crestron DM-MD16X16 or equal with DMC-CAT-DSP, DMC-VID-RCA-A, DMC-HD-DSP input cards as required.
17. Output cards for the Switcher - Crestron DMCO-33 and DMCO-22 or equal as required.
18. Media Receiver [at Projector] - Crestron DM-RMC-100 or equal.
19. Remote source input plate - Crestron DM-200-2G or equal.
20. Input plates for audio wired mic sources - Extron CMP101 and MAAP 70-296-13 or equal.
21. Audiovisual LAN Edge Switch - Provide Ethernet switch in AV rack by Cisco or HP.

    a. Switch to have (2) spare ports for uplink to owner's network.
    b. Uplink data cables to IDF by Structured Cabling (SCS) contractor.
    c. Provide all patch cables as required.

22. Projector - Mitsubishi UD8400U with appropriate Lens.
23. Projection Screen - Draper Signature/Series V with M1300 surface
24. Projector Lift - Draper SL4 size B with LVC-III low voltage control (momentary closure for up/down control).

    a. Provide seismic longitudinal and transverse supports per zone 4 and AHJ requirements.
    b. Provide all hardware and bracing necessary for a complete assembly to solidly support projector at optimum height.

25. Motorized projection screen and wall switch - Provided and installed by E.C.. AV Contractor to connect low voltage control to AV system for control from touch panel.

26. Audio Amplifiers - QSC CX302 with IT – 42 Transformer, or approved equal.
27. Digital Signal Processor - Biamp Audiaflex with IP2 and AEC-2HD input cards and OP2e output cards as required.
28. Wireless Microphone System - Shure ULX Wireless. Wireless microphone UR124S/BETA58, Shure lavalier mic with body pack UR1-SCB6B, and Shure wireless receiver UA845-SWB and Shure direction al antenna UA870USTV. Provide (2) each.
29. Wired Microphones - Shure SM58-CN. Provide (8) wired microphones.
30. Provide all plenum rated cables for a complete and operable system. Provide all patch cables to include spares for owner provided equipment for a complete and operable system.
31. Blue-ray disk players -
32. HD Cable Tuners - AVermedia TVbox 11 with remote control and power supply.
33. Audiovisual Equipment Rack System - Amplifiers and control equipment shall be housed in a floor mounted equipment rack:

    a. Include all rack mounting kits and power strips as required for complete installation of all equipment.
    b. Middle Atlantic full height Middle Atlantic WRK-44SA-32 with vented top and power strip. Include USC-6R Power Sequencer, MPR-6 Raceway, and RLM-20 power modules as required.
    c. Input power to be hardwired by E.C..

34. Analog/Digital Tuner - Aurora V-Tune-PROHD.
35. CD Player/recorder - Alesis ML9600, or approved equal.
36. AM/FM Tuner shall be Tascam TU-690, or approved equal.
37. AM/FM Antenna kit shall be Pixel Technologies AFHD-4
38. Video scaler shall be Extron DVS304.
39. Preview Monitor shall be Marshall V-R151DP-AFHD, or approved equal.
40. Wireless Keyboard/Mouse suite - Gyration GP3200-001, or approved equal.
41. Cabling and connectors – Provide all required cables and connectors to furnish and install a complete and fully functional system.
42. Miscellaneous materials – Provide all materials necessary to furnish and install a complete and fully functional system.

2.7 PROJECTION WALL AT ENTRY A100 [BUILDING A]

A. System Description and Functional Requirements

1. The A/V systems shall be utilized for presenting, viewing and listening to multimedia presentations and cable broadcasts as well as a public address system. The system shall utilize/integrate source input from the security video surveillance system [specifically the outdoor-view of the open-space-directed camera mounted at the west end of Building A], DVD/VCR, Cable, Blu-ray, computer, and other inputs for output to LCD projectors and sound reinforcing systems. The AV system shall be controlled by a touch panel control system. The control system shall be able to control the functions of the AV equipment, audio volume, and projection screen. The AV system shall be integrated into lighting control systems, if required on plans. The Public Address system shall consist of a audio processor with built in audio components including mixer, compressor/limiter/gate unit, and equalizer.
2. The A/V system shall provide clear, natural sound uniformly distributed throughout the Entry [lobby] area. The system shall utilize speakers as shown on the Plans. The AV system shall also be able to display High Definition video resolution without any video distortion.
3. The system shall have adequate dynamic range without audible clipping or distortion to

accommodate all types of program material. Electronic equalization shall be employed to insure smooth frequency response and high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and transients.

4. The system frequency response, shall be within + - 2dB from a curve which is flat from 80Hz to 4kHz and decreasing 3dB per octave from a relative level of 0 dB from 4kHz to 10kHZ. There shall be a minimum 12dB roll-off above 10 kHz and below 63 Hz. Uniformity of coverage of the system at seated ear height (42") shall be within + - 3dB in the 4kHz 1/3 octave band at any seat location using pink noise as a test signal.
5. System noise shall not exceed an equivalent input noise of -120dB based on a 20KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.
6. The sound level capability of program material levels produced in all seats shall be at least 90dB when measured with a scale filter. There shall be at least 6dB of amplifier headroom. When driven to maximum output, clipping shall first occur in the power amplifier.
7. The system shall provide clear audio to all areas covered by the system. Each zone shall be wired discretely to the correct zone on the AMP. See A/V drawings for exact location. A wall mounted selector switch will enable sound to be played in 2 or more zones simultaneously.
8. A presentation system shall be installed in the meeting room. The audio video equipment shall consist of a DVD/VCR combination unit, Blu-ray DVD Player, AM/FM tuner, AM/FM antenna, CD Player/Recorder, Audio/Video Matrix Switcher, HDMI switcher, touch panel audio/video control system, County provided computer, wireless keyboard, wireless mouse, multimedia audio/video input wall plate, CATV receiver, equipment rack, amplifier, and speakers. The multimedia audio/video input wall plate shall have inputs to accommodate for HDMI, VGA, composite video, S-Video and corresponding audio signals.
9. With the exception of the multimedia audio/video wall plate, wireless keyboard, wireless mouse, and speakers, AM/FM antenna, wireless audio/video touch panel, and the assistive listening emitter panel, the equipment shall be rack mounted in the equipment rack located in the audio control room.
10. The presentation system shall provide audio, video, and data signals to be displayed on the projection screen and heard through the speakers.
11. An audio/video matrix switcher and HDMI switcher shall be installed to select between the sources to be displayed on the projection screen via the projector and selected the audio source to be heard through the speakers.
12. Touch panel control system shall be installed to control the functions of the projector, projector lift, projector screen, DVD/ VCR combination unit, Blu-ray DVD player, CD player/recorder, audio/video matrix switcher, HDMI switcher, screen and audio processors, AM/FM tuner, and CATV receiver box. The control system shall be able to control the audio volume levels of the meeting room PA and presentation systems. The touch panel control system shall be able to control the power on/off functions for all of the audio/video equipment. The control touch panels shall select the audio, video and computer source to be displayed and heard on the presentation system. A wireless control touch panel with docking station shall be installed and wall mounted in the meeting room. The Communications Contractor shall configure and program all hardware and software for the control touch panels, control system, and audio/video switcher, HDMI switcher, and all other hardware and software associated with the meeting room audio video system. All programming data, configuration, and application software shall become the sole property of the County for the County’s use. The Communications Contractor shall provide two copies to the County all programming data, configuration, and programming application software on CD/DVDs.
13. The presentation system shall be configured so that the audio from the meeting room public address system can be recorded on the CD recorder.

14. A CATV drop and receiver box as necessary shall be installed from the CATV system in the MCR room and installed in the equipment rack. The TV drop shall be integrated into the audio/video system to be displayed in the meeting room over the presentation system.
15. A multimedia audio/video wall plate shall be installed at the front of the meeting room and also at the rear of the meeting room. The various audio/video connectors shall be connected to separate individual inputs of the audio/video switcher and HDMI switcher, to be selected as an individual audio/video source.
16. The equipment rack shall be installed and earthquake braced at the top and bottom of the rack. The equipment rack shall be grounded. The equipment rack shall have a vented top panel. The equipment rack shall have a power strip with surge suppression and circuit breaker. All blank rack spaces shall be covered with black vented panels.
17. The Communications Contractor shall furnish and install a laminated "as built" drawing of the wiring diagram for the presentation, public address, and video conferencing systems in the meeting room. The drawing shall be 36"W x 24" H. The drawing shall show all components of the presentation, public address, and video conferencing systems and their interconnects. The drawing shall be installed and mounted on the wall in the audio/video control room.

B. Equipment and Materials

The system shall utilize AV products as shown on the Plans and listed below. These products shall be considered to be the minimum quantity, performance, functionality and quality levels. If additional and/or upgraded components are needed to meet the performance requirements of this design-build specification, the contractor shall include all costs for such added and/or upgraded components in the base bid.

1. DVD/VCR Combination unit – JVC DR-MV150B
2. Blu-ray DVD player – Sony BDP-S590. Output to include HDMI.
3. CD Player/recorder – Tascam CD-RW901SL
4. Wallplate Multimedia Audio/Video/VGA/HDMI extender wall plate transmitter – Extron MTP/HDMI UTAD
5. Multimedia Audio/Video/VGA/HDMI extender receiver (for wallplate transmitters) – Extron MTP/HDMI UR
6. Cabling and connectors – All required cables and connectors to furnish and install a complete and fully functional system.
7. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.
8. CD/MP3 player shall be Denon DN-C550R.
9. Loudspeakers - Electrovoice EVID C8.2 2-way or approved equal.

    a. Include back can, grille, tile rails, and all necessary mounting hardware. Verify grille color with architect prior to ordering. Grilles shall be painted to match ceiling color where necessary.
    b. All loudspeakers are to be adjusted to have the same sound pressure level (SPL), plus or minus two db at four feet above the floor regardless the mounting height.

10. Touch panel control panels for Multipurpose Room B103, B0104, and B105 shall be Crestron TPS-6L or equal. Provide BB-6L or equal backbox to E.C. for installation in wall.
11. Processor - Crestron Pro 2 or equal with Crestron C2NET-1 interface card and C2N-HBLOCK Distribution Block.
12. Digital Switcher - Crestron DM-MD16X16 or equal with DMC-CAT-DSP, DMC-VID-RCA-A, DMC-HD-DSP input cards as required.

13. Output cards for the Switcher - Crestron DMCO-33 and DMCO-22 or equal as required.
14. Media Receiver [at Projector] - Crestron DM-RMC-100 or equal.
15. Remote source input plate - Crestron DM-200-2G or equal.
16. Input plates for audio wired mic sources - Extron CMP101 and MAAP 70-296-13 or equal.
17. Projector - Mitsubishi UD8400U with appropriate Lens.
18. Audio Amplifiers - QSC CX302 with IT – 42 Transformer, or approved equal.
19. Digital Signal Processor - Biamp Audiaflex with IP2 and AEC-2HD input cards and OP2e output cards as required.
20. Provide all plenum rated cables for a complete and operable system. Provide all patch cables to include spares for owner provided equipment for a complete and operable system.
21. HD Cable Tuners - AVermedia TVbox 11 with remote control and power supply.
22. Audiovisual Equipment Rack System - Amplifiers and control equipment shall be housed in a floor mounted equipment rack:

    a. Include all rack mounting kits and power strips as required for complete installation of all equipment.
    b. Middle Atlantic full height Middle Atlantic WRK-44SA-32 with vented top and power strip. Include USC-6R Power Sequencer, MPR-6 Raceway, and RLM-20 power modules as required.
    c. Input power to be hardwired by E.C..

23. Analog/Digital Tuner - Aurora V-Tune-PROHD.
24. CD Player/recorder - Alesis ML9600, or approved equal.
25. Video scaler shall be Extron DVS304.
26. Cabling and connectors – Provide all required cables and connectors to furnish and install a complete and fully functional system.
27. Miscellaneous materials – Provide all materials necessary to furnish and install a complete and fully functional system.

2.8 GENERAL PRODUCTS FOR SYSTEMS

A. AV outlets shall be by Altinex, Panel Crafters, Extron, or SP Controls of proper configuration for function as specified on drawings mounted in a wall outlet with stainless steel plate or a floor box as indicated on the Plans. Plates shall be engraved with proper ID.

B. CABLE:

1. Microphone cable shall be West Penn 291 or Plenum 25291 as required.
2. AV system speaker cable shall be West Penn 294 or Plenum 25294B as required.
3. All cable shall be CL3 type or better and of the type approved for the areas where it is used. All cables installed in underground conduits shall be Paige AQC types. All Cable shall be West Penn or Equal by Paige or Belden,. Provide, conductor gauge, quantity of conductors, shielding etc per equipment manufacturer’s recommendations. Cable gauge shall be sufficient to prevent more than 3% voltage drop to the furthest device. Additionally, the quantity of conductors to each device shall be such that all features of the device can be utilized. All cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC®) Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear CMP (Plenum Rated), CM/CMR (Riser Rated) and/or appropriate markings for the environment in which they are installed. All fiber optic cabling/ tube cabling shall bear OFNP (Plenum Rated), OFNR (Riser Rated) and/or appropriate markings for the environment in which they are installed. Cable utilized underground shall be

outside plant rated. Upon entering a facility, the cable shall be transitioned to the appropriate cable type outlined in the NEC or shall be run to its destination within the facility in conduit.

4. Equipment interconnecting cables shall be provided and installed as required to make the system fully functional.

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. The installation, configuration and wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's installation instructions and guidelines. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized installer of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications. Contractor shall also program and configure all hardware and software elements in the equipment to provide a fully functional system as intended. Contractor shall coordinate with the Owner [ISD project management team] to define the configuration the touch panel graphic user interface. Contractor shall be certified by the equipment manufacturer to install, program, and configure the equipment.

B. Furnish all conduits, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.

C. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro wraps. All cables shall be numbered for identification.

D. Splices of conductors in underground pull boxes are not permitted.

E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

G. The system must meet all local and other prevailing codes.

H. All cabling installations shall be performed by qualified technicians.

I. All cabling shall be splice free.

J. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.

K. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.

L. Under no circumstance are "channel locks" or other pliers to be used.

M. Plenum rated cable may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The cables shall not be laid directly on the ceiling panels. The use of cable ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.

N. All firewalls penetrated by AV Contractor shall be sealed by use a non-permanent fire blanket or other method in compliance with the current edition of National Fire Protection Association (NFPA) and the National Electric Code (NEC) or other prevailing code. The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.

O. All equipment racks shall be bolted to the floor by the contractor once the Owner determines the exact location for each rack. The earthquake mounting brackets that come with each relay rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the racks final location – the need to unbolt racking equipment to access or service equipment is not acceptable.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

A. The installer shall, upon completion of the system, orient all antennas, adjust all controls, etc., to provide a system operating at maximum capability.

B. Submit block diagram and shop drawing of equipment.

C. The AV Contractor shall furnish and install a laminated “as built” drawing of the wiring diagram for the presentation, public address, and video conferencing systems in the meeting room. The drawing shall be 36”W x 24” H. The drawing shall show all components of the presentation, public address, and video conferencing systems and their interconnects. The drawing shall be installed and mounted on the wall in the audio/video control room.

3.3 GENERAL TESTING REQUIREMENTS

A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.

3.4 SPECIFIC SYSTEM TESTING REQUIREMENTS

A. Provide a Techron TEF 20 and all other instruments to use during testing and adjusting of the system. Perform the following tests and include reports in the Owner’s Manual:

1. Time align and balance the system.
2. Raw house frequency response.
3. On-axis frequency response after equalization.
4. Maximum program material sound level and head room.
5. Maximum system gain.
6. Hum and noise signal-to-noise of the overall system for each mike input channel.
7. Adjust system gain controls for optimum S/N ratio so that full amplifier output will be

achieved with 0dBm at a line-level input.

8. Correct polarity of speakers and microphones.
9. Distortion shall be less than 5% THD.
10. Loss of articulation on consonances shall be less than 15%.

3.5 FINAL ACCEPTANCE

A. The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.

B. The Owner or Owner's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the owner.

C. Two copies of all certification data and drawings for all identifications shall be provided to the Owner before the owner's review.

D. The Owner or Owner's representative will review the installation and certification data prior to the system acceptance.

E. The Owner or Owner's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the Owner reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the contractor.

F. In the event that repairs or adjustments are necessary, the contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.

G. The contractor shall provide not less than 24 (24) hours for site instruction of personnel in the operation and maintenance of the installed systems. This instruction time shall be divided as directed by the Owner.

H. The contractor shall hand to the owner a copy of any applicable installation specific software configurations in CD format.

END OF SECTION

SECTION 281010 – SECURITY SYSTEMS

1.1 SUMMARY

A. This Section includes security systems:

1. Intrusion detection system [IDS].

2. Access control system [ACS].

3. Closed-circuit television system [CCTV]; also referred to as the video surveillance system.

B. The work includes all labor, material, equipment, supplies, testing, and accessories required to provide complete security systems as indicated on the drawings and as specified herein.

C. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, backboards, and any other related items shall be furnished and installed complete under this section, such that the systems shall perform all functions listed herein in compliance with all of the specified requirements.

1.2 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.

B. All applicable portions of Divisions 1 and 26 shall apply to this section as though written herein completely.

C. Coordinate with door hardware specifications and schedules for access control system device interface and interconnection.

1.3 GENERAL REQUIREMENTS

A. The contractor [in the following, “contractor”, “communications contractor”, and “security contractor” will be used interchangeably, and the requirements stated herein shall be applicable to all] shall hold current State of California C-7 and C-10 Licenses, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the Owner of performance and satisfactory service during the guarantee period.

B. Security Intrusion Detection, Access Control, and CCTV systems contractor must be an authorized, certified installer/dealer for Bosch security, Sielox access control, and American Dynamics CCTV systems. The contractor must be regularly engaged in the supply of security and access control systems, and must have occupied an established office for a period of not less than five (5) years prior to bid date within the Project's geographic market area. The Bosch, Sielox, and American Dynamics certified dealership letters must be provided to the County of Los Angeles ISD Contracting Division at time of bid and may at the County’s discretion verify with the manufacturers prior to commencement of work. The dealer/contractor responsible for the

installation of the Bosch security, Sielox access control, and American Dynamics CCTV systems must be the dealer who holds all required dealership letters and has attended all the manufacturer's training certification courses prior to bid date.

C. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.

D. All work shall be performed under the supervision of a company accredited by the basic equipment manufacturer and such accreditation must be presented.

E. The installing contractor shall be a factory authorized distributor and warranty station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The installing contractor shall maintain a spare set of all major parts for the system at all times. All equipment and device subassemblies shall be 100% backed up with stock at contractors shop.

F. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Distributor and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.

G. All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.

H. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment with the most current software package available at the time of installation. At the time of Owner Acceptance of the installation, all equipment shall include any and all updated software revisions. In addition, when the software is available in disk format, a backup copy of the most up to date revision, in disk format, shall be handed to the Owner at the completion of the project.

1.4 QUALITY ASSURANCE

A. In order to maintain a high degree of quality assurance, the Contractor shall, without exception, use the parts and supplies as specified on the drawings and in this specification.

B. It is a mandatory requirement that a single Contractor perform the work described in this specification.

1.5 GENERAL SUBMITTAL REQUIREMENT

A. Submittals shall be presented and formatted per the guidelines in Division 1.

B. Submittal shall be furnished in an 8 ½" x 11" format in 3-ring loose-leaf binders. The cover and the title page shall bear the project name, capital project number, specification number, name of

contractor and date. The document shall have a table of contents and page numbers on each of the pages including brochures and drawings.

C. Drawings shall be no larger than 34" x 22". Drawings larger than 8 ½" x 11" shall be folded to 8 ½" x 11" so that the drawing's name and page number are visible and can be unfolded without being removed.

D. Reproduced material shall not be subject to fading by light or heat and shall have high contrast for easy reading.

E. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.

1.6 PRE INSTALLATION SUBMITTAL REQUIREMENTS

Within thirty (30) calendar days after the date of award of the Contract, the Contractor shall submit the following:

A. Submittal Binder: Submit nine (9) copies of the complete Submittal Binder to the Owner for review. [Three (3) copies to the Capital Project Section, two (2) to the ISD Telecommunications Systems Engineer, and (3) for General Contractor and Architect.] The binder shall consist of five major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.

1. The first section shall be the "title sheet" which shall include the submittal date, project title and address, name of the contractor, and name of the Owner.

2. The second section shall contain proposed material list including manufacturer's name, model number and technical data for all equipment the contractor proposes to install. Items shall be identified by specification section and paragraph number. The technical data shall consist of copies of factory issued catalog sheets or brochures, which give ratings and specifications for the proposed items. Include statement describing exceptions being taken, if any, to the specifications wherein the submitted equipment or design varies from that originally specified.

3. The third section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in PART 2 of this specification and all materials described on the construction drawings. Also include manufacturer’s cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the index.

4. The fourth section shall contain Single line system diagram identifying and showing interrelationships between equipment items and how they are interconnected. The diagram shall be based on the drawings included in the Construction Documents. It shall be updated to show quantities and part numbers for all components including patch panels, cable, conduit, cabinets and equipment racks, splices, splice cases and all other associated components.

5. The fifth section shall contain shop drawings showing details of fabricated items, rack elevation drawings, console arrangements and schematics of custom designed items.

6. For any exceptions that are not approved by County, contractor shall resubmit the information in complete compliance with the specifications and drawings.

7. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.7 POST INSTALLATION SUBMITTAL REQUIREMENTS

Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:

A. Record Documentation

1. Record drawings shall be made on separate clean blueline prints of the electrical drawings issued by the County or Architect and shall be reserved for the purpose of showing work as actually installed, including accurately dimensioned locations of all conduit stub-outs and pull boxes, routing of all conduits extending from or between buildings and locations of all telecommunications equipment not installed according to drawings.

2. Drawings shall be kept up to date with neat and legible annotations made thereon daily as work proceeds, showing work as actually installed. Additional sheets may be attached to show greater detail. Drawings shall be available at all times for inspection and shall be kept on the job at a location designated by the County.

3. Contractor at his option may use an additional set of drawings for daily field annotations. This set of drawings shall be kept at the site.

4. Final record drawings shall be submitted with floor numbers, room numbers, panel directories and all other identification necessary to conform to number designations for occupancy rather than to construction numbers. All buried conduit and/or underground conduits stubs intended for future extension shall be accurately shown as to depth and exact measurement from a permanently established landmark, such as building or structural features. Contractor shall also submit completed Bosch/Radionics programming sheets and as-built 8½" x 11" drawings(s) that indicate each device/point location identified to reflect 16 character idle text in programming on not less than 12 point text on floor plan.

5. On completion, record drawings shall be signed, dated and returned to the County for inspection and approval before acceptance of any work.

6. Provide four (4) sets of drawings. [Three (3) sets of drawings to Capital Projects Section and one (1) set to ISD Telecommunications Systems Engineer.]

B. Final Submittal

Three (3) complete sets of the Final Submittal including a full set of the drawings on bond paper shall be delivered to the Capital Projects Section and two (2) complete sets to the ISD Telecommunications Systems Engineer prior to acceptance tests and as a condition for final payment for the project to the contractor. It shall include all the information necessary to maintain each system, and shall consist of the following:

1. Operators Instructions (as applicable).

2. Factory-issued Service Manuals for each piece of equipment installed. The manuals shall contain complete parts lists, detailed schematics, circuit descriptions, maintenance procedures and trouble-shooting methods. In the event such manuals are not available from the factory, it shall be the responsibility of the contractor to compile and submit the required information.

3. A System Manual for each system furnished. This manual shall complement the above service manuals with all necessary additional information unique to the system that is not otherwise provided, such as a list of applicable service manuals, options selected, jumper or strapping choices, modifications, and detailed wiring information. All manuals shall be bound in a 3-ring binder with tabs identifying each system.

4. Record Drawings (see "Records Documentation" above).

5. Two (2) electronic copies of all drawings in AutoCAD [latest version] shall be provided. [One copy to the Capital Project Section and one copy to the County ISD Telecommunications Systems Engineer.]

1.8 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. Prior to Owner acceptance, the contractor shall provide to Owner, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The Owner will only acknowledge acceptance upon submittal of a valid manufacturers warranty.

B. The warranty shall commence from the date of final written acceptance by the Owner.

C. All conditions for obtaining the manufacturers warranty shall be the sole responsibility of the contractor.

D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.

E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

1.9 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. The entire system shall be warranted free of mechanical or electrical defects for a period of three (3) years after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the Owner.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Material, Equipment and Software shall be products of a single manufacturer. All material, equipment and software shall be the latest technology and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place. Major hardware components such as intelligent reader modules, intelligent input modules and intelligent output modules shall be manufactured in the USA using nationally recognized quality processes such as Six Sigma. Acceptable manufacturers include:

1. Intrusion Alarm - Bosch – County standard

2. Access Control System – Sielox – County standard

3. CCTV System – American Dynamics – County standard

B. The equipment shall be available through Authorized, factory-trained and certified Bosch, Sielox, and American Dynamics Business Partners or Dealers.

C. Hardware Manufacturer Experience: All system hardware and firmware shall be produced by manufacturers regularly engaged in the production of electronic security management systems and application software for at least 10 years.

D. Software Manufacturer Experience: All system and application software shall be produced by manufacturers regularly engaged in the production of electronic security management systems and application software for at least 10 years.

E. System Installer Experience: The system shall be installed by a Bosch/Radionics, Sielox, and American Dynamics factory-trained contractor who has been regularly engaged in the installation of electronic security management system equipment for at least 5 years.

F. System Component Design: Electronic security management system components shall be designed for continuous operation. Electronic components shall be of surface-mount technology [SMT] manufactured process. All connections to the intelligent controllers and intelligent modules shall be protected by SMT type TVSS (Transient Voltage Surge Suppressors).

1. Modularity: The contractor shall provide equipment designed for increase of system capability and capacity. System components shall be designed to facilitate easy maintenance and replacement of components and devices. The system shall auto-configure new and replacement controllers for address, baud rate and communication type. Systems using controller hardware with rotary switches, dipswitches and jumpers for address, baud rate and communication type are not acceptable.

2. Maintainability: Components shall be designed to be maintained using commercially available tools and equipment. Components shall be arranged and assembled so they are accessible to maintenance personnel. There shall be no degradation in tamper protection, structural integrity, EMI/RFI attenuation, or line supervision capability after maintenance when it is performed in accordance with manufacturer's instructions.

2.2 SECURITY INTRUSION DETECTION AND ALARM

A. The intent and purpose of this system shall be to provide a security/intrusion entry alarm system in the building. All perimeter doors, roof hatches, or other external entry points shall be equipped with dedicated, concealed magnetic contact switches. Interior protection shall be provided by combination passive infrared/microwave detectors and glass break sensors located as indicated on the plans.

B. The alarm siren(s) shall be installed in the plenum above the keypad(s) as indicated on the plans. Each alarm device shall report to the LA County Sheriff Central Station as a separate point. Use point expander OctoPopit module(s) for the point expansion of the alarm panel and a separate enclosure(s) D8103 to house the expansion device(s). Install alarm cables home run from each alarm device to the panel. Appropriately sized "end of line" resistors shall be placed at the device end only.

C. Installation of modules, devices and wiring shall be in accordance with current Bosch/Radionics design, installation, and engineering standards. Additional D8132 Battery Charger / power supplies, batteries, OctoPopits, OctoRelays, and associated cables shall be mounted in additional D8103 cabinet(s). Maximum build out per D8103 or enclosure shall be 5 modules and or 2 each 7AH/12V batteries

D. The intrusion alarm cables shall be installed horizontally through the ceiling area in a neat and orderly fashion and supported by cable hangers at 4-5 ft. intervals. The cables shall be positioned at least six (6) inches from electrical equipment, electrical wiring, telephone cabling, and intercom cabling and data wires. Exposed wiring shall only be permitted above ceiling level or ten feet from floor level. The installation shall comply with the County of Los Angeles Building Safety and Fire Codes. Contractor shall obtain all permits required for scope of work and pay all associated permit fees. Contractor shall supply copies of all permits acquired.

E. The Bosch/Radionics D7412/9412 Alarm Communicator Panel and associated equipment enclosures shall be installed in the MCR room. Clearance in front of all cabinets shall be a minimum of 36 inches. The alarm shall report to the County Central Station. If required, Owner will be responsible for obtaining an alarm permit from the local law enforcement authority.

F. The Bosch/Radionics Alarm Communicator Panel shall power all peripheral alarm devices for 24 hours of standby time with 5 minutes in alarm condition conforming to NFPA 72 central station requirements in the event of power failure. Bosch/Radionics load calculation worksheet page 61 & 63 of document 74-07692-000-D shall reflect all security equipment component current loads, standby battery requirements and standby battery calculations. Standby power on battery back up shall be at least one (1) hour. Additional D8132 battery charger modules and batteries shall be installed in Bosch/Radionics D8103 enclosures. All transformers shall be mounted in D8004

enclosures. The intrusion alarm equipment shall have a dedicated branch circuit identified and labeled with panel and branch circuit number on power receptacles covers.

G. Terminations and connections throughout the system shall employ terminal strips with rising wire clamp screws or solder terminals, all in cabinets or enclosures. Telephone punch type blocks, and electrical wire nuts are not acceptable. Although shielded cable should not be used, in cases where it is used, all shields will be grounded. Shields shall be grounded on one end only. See Equipment Item 25 regarding manufacturer's noise immunity design thresholds, listed below.

H. The security contractor shall be responsible for programming and testing the alarm panel in the local mode. The Owner [LA County ISD FOS] shall program the system to communicate with the Sheriff Central Station. The security contractor shall furnish the Owner [LA County ISD Project Manager] with the completed Bosch programming sheets and As-Built (8½" x 11") drawings(s) that indicate each device/point location identified to reflect 16 character idle text in programming on not less than 12 point text on floor plan prior to ISD FOS inspection, tests and programming of the system to communicate with the Sheriff Central Station. The security contractor shall submit As-Built drawings as outlined in paragraph 1.7B Final Submittal above.

I. View Point status shall be configured in all Keypads or as designated by the Owner [ISD Project Manager].

J. The security alarm contractor shall be an authorized and current direct Bosch dealer as described in paragraph 1.3 General Requirements above. The contractor must provide proof of dealership with Bosch, as well as verification of prior experience with Bosch Controllers and System design, Detection Systems and have experience with programming system features. The installer must provide proof of training via a valid training certificate prior to any work to be performed. Certificate must have been issued more than six (6) months and less than five (5) years prior to installation date. Proof of dealership must be attached with the contractor quotation.

K. The system shall be armed and disarmed manually by authorized LA County staff or on-site security staff.

L. The alarm contractor shall provide hands-on training to LA County staff at a date and time to be determined by the County Library in the operation of the system. A roster of attendees shall be documented.

M. The intrusion detection system shall include, but not be limited to, the following equipment and materials

1. Digital keypad – Bosch/Radionics model D1255 Alpha IV.

2. Alarm panel – Bosch/Radionics model D7412G or D9412G, RAM IV or greater software.

3. Passive infrared / microwave detectors – Detection Systems DS970 (Long Range).

4. Passive infrared / microwave detectors – Detection Systems DS950 (Med. Range).

5. Passive infrared / microwave detectors – Detection Systems DS9360 (360°).

6. Glass break sensor – Honeywell FG1625F.

7. Siren/Speaker – Sentrol MPI36.

8. Magnetic door contact switch, flush mount – Sentrol model 1078CT.

9. Magnetic door contact switch, surface mount, non-exposed wiring – Sentrol 1042TW

10. Magnetic door contact switch, surface mount, exposed wiring – Sentrol model 2505.

11. Magnetic door contact switch, floor mount – Sentrol model 2707A.

12. Transformer enclosure – Bosch/Radionics model D8004.

13. Non-fire enclosure – Bosch/Radionics model D8103.

14. Battery – D126 two (2) required for fire panel.
15. Transformer – Bosch/Radionics model D1640.

16. Keypad back boxes – Bosch/Radionics model D56.

17. Aux relay – Bosch/Radionics model D136.

18. Phone jack, modular – Bosch/Radionics model D128.

19. Battery charger – Bosch/Radionics D8132.

20. OctoPopit – Bosch/Radionics 8128D.

21. OctoRelay – Bosch/Radionics D8129.

22. Transformer kit – Bosch/Radionics D8004.

23. Dual Phone line monitor – Bosch/Radionics D928 (Fire alarm applications)

24. Alarm cable – plenum rated, stranded, PVC insulated, shielded, 18 gauge or larger, 2 pair twisted wire for keypad, glass break sensors and passive infrared / microwave detectors. Plenum rated, stranded, , minimum of 18 gauge or larger, 1 pair twisted wire for door switches.

25. Shielded wire shall be required if Bosch/Radionics noise immunity design thresholds will be exceeded.

26. All other cables and/or hardware required to ensure the system is fully functional in optimum level.

2.3 SECURITY ACCESS CONTROL

A. The intent and purpose of this system shall be to provide access to secured areas of the facility through the Access Control System [ACS].

B. The system design utilizes a Sielox Pinnacle Access Software System design. One server computer is required. The software will allow for Owner to control access for only their doors and employees through the programming of the restricted database feature on the Access Control System Software. Additional, remote workstation computers may be required and installed as designated on the plans. The system will provide the capability for remote access database management or management via client network.

C. The ACS shall NOT be integrated with the Bosch Intrusion Alarm system. If required by Owner, the ACS shall be integrated with the Intrusion Alarm system to provide access and disarm areas or security zones independent of the other zones. This may at Owner discretion incorporate an access level unique to a class of cardholders that when presented, will provide a dedicated momentary relay closure to disarm the Intrusion Alarm system.

D. The ACS system shall include the Sielox Aegis2 Graphical & Control Integration Software. The Aegis2 software feature shall allow the ability to control all alarms produced by the Bosch or Sielox control panels and will display alarm information on any workstation with the Aegis2 Graphical Maps Display license. The Aegis2 shall allow for real time event monitoring of all the access control door locations. Any authorized administrator of the system shall be able to remotely lock or unlock doors from the Aegis2 application. The modular architecture of the Aegis2 system and subsystems shall allow for all the features and functions of the Bosch alarm panels to provide redundancy of alarms on Graphical Map Displays or on the Bosch alarm keypads. Privileges shall be determined by the Aegis2 system and allowed per workstation. Each workstation shall be programmed to receive any or all the alarms through the Sielox networked security system.

E. The security contractor shall furnish and install all proximity card readers as indicated on the plans. The card readers shall be connected to locking devices on the doors at the locations specified on the plans. To comply with ADA code requirements, all proximity card readers shall be installed within six (6) inches of the door they are controlling.

F. Each door shall have its own dedicated, magnetic door contact switches at the card reader location which shall connect to the card access panel to reset the locking device at the door when opened.

G. The locking devices must be rated at 24Vdc. for Continuous Duty. Power supplies for the locking devices shall be mounted remotely in the nearest telecommunications room (MCR B114, TR A119).

H. Cabling shall be a minimum #18/2 AWG wire gauge conductors that reflect less than a 10% voltage drop to any access control component.

I. The security contractor is to program system configuration and restricted database feature. There will be no equipment substitutions accepted in the Sielox entry system section. The Contractor shall provide fifty (50) initial cards with the system. The contractor shall be responsible for initial programming of all requested time zones, access levels, card users and cards. The contractor shall be responsible to provide a minimum of eight (8) hours user training on system use, programming, backing up critical database files and creating report templates.

J. The contractor shall furnish and install the Fail Secure door lock hardware and electrified door hinge with 4' cable spliced to the door lock. The other side of the hinge shall be wired by the security contractor. The purpose is to ensure that the door will stay latched in case of power failure. Panic hardware shall be provided on all Fail Secure doors for egress as specified on the plans. Any penetrations of doors after UL Listing shall require UL re-certification.

K. Properly bond and ground all shields on one side only.

L. Provide an uninterruptible power supply [UPS] for ALL system components and equipment, including servers, workstations, monitors, enrollment stations, and accessories, for up to four (4) hours continuous use.

M. Access control system shall employ proximity readers, request to exit sensors etc. to allow authorized personnel access to the facility. Access control system shall interact with security system to shunt door contacts during request-to-exit sensing.

N. All cable shall be run in conduit. All Cable shall be West Penn, Belden or Equal. Provide, conductor gauge, quantity of conductors, shielding etc per equipment manufacturer's recommendations. Cable gauge shall be sufficient to prevent more than 3% voltage drop to the furthest device. Additionally, the quantity of conductors to each device shall be such that all features of the device can be utilized. All cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC®) Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear CMP (Plenum Rated), CM/CMR (Riser Rated) and/or appropriate markings for the environment in which they are installed. All fiber optic cabling/ tube cabling shall bear OFNP (Plenum Rated), OFNR (Riser Rated) and/or appropriate markings for the environment in which they are installed. Cable utilized underground shall be outside plant rated. Upon entering a facility, the cable shall be transitioned to the appropriate cable type outlined in the NEC or shall be run to its destination within the facility in conduit.

O. Protect any roof hatches in each building with magnetic contacts (By Sentrol) and annunciate separately with a day zone to indicate opening and closing of all hatches during the day and alarm at night.

P. The access control system shall include, but not be limited to, the following equipment and materials:

1. Software – Sielox Pinnacle Software with Web Seat License – AC-PNWWST

2. Sielox Performa Series Proximity Reader – AC-125SG

3. Sielox Performa Series Reader (mullion-mount)- AC-125MG

4. Sielox Proximity card – AC-15C-E (Quantity = 50).

5. Sielox 32-Bit Terminal Controller – AC-1700-NN2 Controller. <u>One AC-1700-NN2 Controller required for every two doors.</u> <u>One AC-EN32 Cabinet required for every 8-doors.</u> Prior to installation ACS contractor shall verify with the County whether to install a RS484 module

per controller or a Sielox LAN module per Controller.

6. Altronix AL600-ULX-FID (for Terminal Controllers) or Von Duprin Power Supply. One needed for every (4) Sielox Controllers, set at 12VDC.

7. Altronix AL600-ULM FID (for Door Locking devices) or Von Duprin Power Supply. One needed for every (8) access control door locks requiring 24vdc less than 500ma each. If any low voltage electrified panic bars are to be installed contractor to verify voltage and amperage requirements and supply the power supply needed for those devices in addition to the other electric locking devices.

8. APC Smart-UPS 1000VA - XL1000VA.

9. 12V, 7AH batteries – two (2) for each panel as required for four (4) hours – Bosch D126.

10. SS&W (Security Servers & Workstations Inc.) - WS200 Intel vPro System Raid Access Control Server Computer. Server shall be a Intel Core 2 Duo™ processor, 2.33 GHz, 1333MHz FSB, 4 MB L2 Cache, 1 GB RAM, 160GB Mirrored SATA Hot Swap Drives, DVD/RW, 1 RS232 Serial Port (up to 16), 4 USB Ports, USB Keyboard, USB Mouse, Dual Monitor Support. Installed Software: Windows 7 Pro, Paragon Disk Backup, SyAM Software System Client. Server shall have a minimum 3-year warranty parts and labor.

11. Von Duprin Panic Hardware Series #99 or #33 (as required) with electrified lever trim and Von Duprin electric power transfer unit #EPT-218 to be provided and installed by the General Contractor or Door Contractor.

12. Sielox Aegis 2 Graphics Display System Application - AC-AST

13. Sielox Aegis 2 Bosch Serial Alarm Driver – AC-SER

14. Magnetic door contacts, flush-mounted and closed loop.- Sentrol 1078CT

15. T-REX Request to Exit Motion Detectors – Bosch DS160

16. Isolation Relays (For Elevator Control – if required).

17. CSC Access Control Composite Cable #588343 (112117-04-1RL0) This composite cable shall have 4-component cables within its jacket. 1st cable shall be a **14-2C** for lock power, the 2nd cable shall be a **18-2C & a 18-4C** for card reader, 3rd cable shall be a **18-4C** for the door switch, and the final cable shall be a **18 -4C** for REX/PIR. Power cables needed for special electrified panic bars shall be determined by the security contractor and included in the design and bid to make the system fully functional.

18. All other cables and hardware required to make the system fully functional.

    a. CSC 112000 (18/2 Shielded CMP cable)
    b. CSC 112100 (18/4 Shielded CMP cable)

Q. Printers

1. The system shall support any standard Windows-compatible printer for reporting, provided the printer manufacturer supplies a Windows print driver.

2. The system shall also support the use of a line printer for real time printing of alarm events.

R. Inputs

1. The systems shall support any industry-standard dry contact type input devices including, but not limited to, magnetic door contact switches, request to exit devices and tamper switches.

S. Output Relays

1. The systems shall support any industry-standard output devices including, but not limited to, electric door locks, annunciators and area lighting. Output relay contacts shall be Form C type and rated at 1A, 24VDC.

T. It is the responsibility of the contractor to ensure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.

U. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

V. All basic electronic equipment (with exception of cable, and field devices) specified herein shall be produced by a single manufacturer of established reputation and experience who shall have produced similar apparatus for at least five years and shall be able to refer to similar installations rendering satisfactory service.

2.4 SECURITY CLOSED-CIRCUIT TELEVISION

A. The intent and purpose of this system shall be to provide video surveillance of selected areas of the facility and site through the security Closed Circuit Television System [CCTV].

B. The security contractor shall furnish and install a Closed Circuit Television (CCTV) system. The CCTV system shall consist of fixed cameras, Digital Video Recorder (DVR) and DVR storage, monitors, matrix video switcher, keyboards, power supplies, uninterruptible power supply (UPS), cabling and associated equipment. The CCTV system shall view various areas within and surrounding areas of the building. The video from the CCTV system shall be displayed on monitors located at the circulation desks in a split screen configuration. A keyboard at the circulation desks will allow the users to select any camera full screen, the split screen image of all cameras, the sequence of all cameras, and any other configuration requested by the County. The matrix switcher, DVR, DVR storage, DVR monitor, DVR keyboard, camera power supplies, and UPS shall be located and rack mounted in the MCR room. The DVR shall be connected to the facility’s LAN/WAN computer network so that the DVR video can be viewed live and recordings played back from the County using the existing client software. The existing client software is the American Dynamics Intellex Network Client.

B. The security contractor shall furnish and install a complete and fully functional CCTV system. The contractor shall furnish and install any and all materials whether or not specified to provide a complete and fully functional CCTV system. The contractor shall configure all settings and programming of the equipment including but not limited to camera titles, presets, recording schedules, and frame rates. The contractor shall coordinate with the Owners Representative in the system settings and configuration.

C. The security contractor shall meet or exceed all Federal, State, and local building codes including but not limited to the National Electric Code and Fire Codes. The contractor shall install all materials in accordance with manufacturer's instructions and specifications. The contractor shall install all materials in accordance with professional standards including EIA/TIA standards.

D. The security contractor shall be an authorized manufacturer dealer/reseller and manufacturer's certified installer of the CCTV system equipment - submit manufacturer's certification documentation at the time of bid submittal.

E. Cabling - The security contractor shall furnish and install all cabling for the CCTV system. The security contractor shall furnish and install all cabling supports as per NEC and EIA/TIA requirements. Cable support shall be independent from ceiling and other equipment supports.

F. Cabling installed in the interior of the building shall be plenum rated. Any cabling installed exterior to the building shall be installed in and protected with weatherproof and watertight conduit and enclosures.

G. The security contractor shall furnish and install one each coax cable from each camera to the CCTV system in the MCR room. The contractor shall furnish and install one each coax cable from each monitor to the CCTV system in the MCR. The contractor shall furnish and install three piece crimp type BNC connectors on the coax cables.

H. The security contractor shall install one each low voltage cable from each camera to the camera power supply. Camera power supply shall be located in the MCR room. The contractor shall install control cabling from each PTZ camera to the video matrix switcher and controller system.

I. Cameras - Camera locations are shown on the plans. The security contractor shall verify camera locations at the site. The contractor shall furnish and install cameras and mounts. The contractor shall adjust the camera lenses and settings to obtain the required views. The contractor shall coordinate with the Owners Representative and end user to determine camera view. The contractor shall readjust the camera lenses and settings as necessary to obtain alternate views as requested by LA County. The contractor shall connect the cameras to the video inputs of the DVR. Pan/Tilt/Zoom dome camera control protocol shall be SensorNet. Camera control cabling shall be individual home runs from each of the PTZ dome cameras to the camera controller hardware.

J. Camera power supplies - The security contractor shall furnish and install the camera power supply in MCR room. The contractor shall mount and securely fasten the power supply to the wall. The contractor shall connect the cameras to the camera power supplies. The contractor shall connect the camera power supplies to the UPS unit.

K. Digital Video Recorder (DVR) - The security contractor shall furnish and install a DVR and DVR storage in the MCR room. The DVR shall be networked into the County LAN/WAN system. The contractor shall furnish and install all core and viewing software on computers as identified by the Owners Representative. The cameras shall be viewed and controlled over the network from remote PCs. The video shall be recorded and viewed live at 2CIF resolution, with a minimum of 7.5 images per second for each camera. The system shall use Active Content Compression Technology. The video storage shall be for 30 days on the internal storage of the DVR and extended storage modules as necessary to provide the 30 day storage requirement. The video shall be recorded continuously during normal business hours and on motion after normal business hours. Should an event be recorded from motion detection, the recording shall have a minimum of five minutes recording before the motion occurrence and five minutes of recording after the motion occurrence. The DVR shall send an alert message via email and text page to staff as designated by the Owner. The contractor shall connect the video outputs of the cameras to the camera inputs of the DVR. The contractor shall connect the DVR to the facility's LAN/WAN network. The contractor shall furnish and install cabling to connect to the facility LAN/WAN network. Contractor shall coordinate with the Owner [County network engineer] to interface and connect the DVR to the facility's LAN/WAN network. The contractor shall ensure that all DVR functions are accessible and operable remotely from the County. The contractor shall connect the DVR to the UPS unit. The contractor shall program and configure all settings and parameters of the DVR. Contractor shall configure the network client software at the remote location to access the DVR via the LAN/WAN network. The contractor shall coordinate with the Owner to determine configuration parameters.

L. The security contractor shall configure the video monitor output of the DVR to display a 4x4 split screen display of all cameras. The contractor shall furnish, install, and connect cabling from the video monitor output of the DVR to a camera input of the matrix switcher. The contractor shall connect the looping camera outputs of the DVR to the camera inputs of the matrix video switcher. The contractor shall have the system certified in writing by the DVR manufacturer that the system has been installed correctly and is fully functional. The contractor shall provide five copies of the certification to the Owners Representative.

M. Matrix video switcher - The security contractor shall furnish and install a matrix video switcher in the MCR room. The contractor shall connect the camera looping video outputs of the DVR to the camera inputs of the matrix switcher. The contractor shall connect the looping outputs of the matrix switcher to the camera inputs of the multiplexer. The contractor shall connect the monitor output of the multiplexer to a camera input of the matrix switcher. The contractor shall connect the monitor outputs of the matrix switcher to the video inputs of monitors located at the circulation desks. The contractor shall furnish and install a matrix switcher keyboard controller at each circulation desk and in the video equipment rack.

N. The security contractor shall furnish and install a video equipment rack cabinet to house the DVR, DVR storage, matrix video switcher, and associated equipment. The video cabinet shall have front and rear rack rails for mounting 19" rack mount equipment. The DVR shall be supported at the front and rear of the unit. The video cabinet shall have locking front and rear doors, vertical power strip with circuit breaker and surge protection, bottom panel, and vented top panel. The cabinet shall have a pull out keyboard and mouse shelf for the DVR and a second pull out shelf for the camera controller. The cabinet shall have appropriate air circulation to properly ventilate and cool the equipment housed within the cabinet. The cabinet shall have 77" of vertical rack space. The cabinet shall be properly grounded, securely anchored to the floor, and seismically secured.

O. Monitors - The security contractor shall furnish and install a desktop mounted 17" LCD monitor at each of the circulation desks as shown on the plans. The contractor shall furnish and install a rack mounted VGA monitor in the MCR room. The contractor shall connect the VGA monitor to the DVR monitor output. The contractor shall connect the monitor outputs of the matrix switcher to the monitors at the circulation desks. The Communications Contractor shall connect the DVR, DVR storage, and matrix switcher monitors to the UPS unit.

P. The security contractor shall install the camera power supplies in the telephone room nearest the camera location. If the distance between the camera and telephone room exceeds the manufacturer's recommendation for low voltage cable distance for the gauge of wire specified, then the contractor shall furnish and install the appropriate gauge of low voltage cable as recommended by the camera manufacturer to accommodate for the cable distance.

Q. The security contractor shall furnish and install the UPS unit in the MCR room. The UPS shall be sized to provide a minimum of two hours of full load run time in the event of power failure. The contractor shall connect the camera power supply, DVR, DVR storage, matrix switcher, keyboards, and VGA monitor to the UPS. The UPS unit shall be installed in the rack using the four post mounting method.

R. The security contractor shall configure all settings of the CCTV system including all parameters of the cameras, DVR, DVR storage, video matrix switcher, and associated hardware and software. The contractor shall coordinate with the Owners Representative for the installation schedule and to deliver a fully functional system. Also the contractor shall coordinate with the appropriate County IT staff to properly configure the DVR and network for CCTV system use over the County LAN/WAN network. The contractor shall also coordinate with the Owner to define the required views for each camera.

S. The installation shall comply with ALL applicable National Electric Codes, Building, and Fire Codes. The security contractor shall apply the following with regards to the low voltage cabling for the CCTV system:

1. Obtain low voltage installation permit from the appropriate authority prior to start of construction.

2. Consult with the building inspector to determine whether there are special local requirements for strapping the cables in the attic and in-ceiling areas.

3. Coordinate with the building's general contractor to determine the cable routings, schedules for cable placement and ceiling inspection.

4. Provide installation of the Caddy J-Hook system cable hangers and sleeves that will support the horizontal cables in the attic and in-ceiling areas per all applicable building code(s).

T. Material and Equipment

1. Fixed Color Day/Night Camera – Bosch VDN-498V03-21 with appropriate varifocal or fixed auto iris lens as required to provide the required camera view.

2. Pan/Tilt/Zoom color day/night dome camera – American Dynamics Ultradome Ultra series with 35 X zoom.

3. Power Supply (Fixed Cameras) – Pelco MCS16-10S (for multiple cameras), Pelco TF2000 (for individual cameras).

4. Power Supply (PTZ dome cameras) – Pelco WCS 1 - 4

5. DVR – American Dynamics Intellex Ultra ADD600ULP150

6. Extended DVR storage – American Dynamics RAID storage system

7. Dell quiet key PC keyboard.

8. Viewing software – American Dynamics Network Client ADDSNCVMKUL

9. Policy Software – American Dynamics Policy Manager ADDSPM12UUL

10. Policy Manager Server Computer – Dell Server Computer to exceed computer requirements as defined by Policy Software manufacturer.

11. Intellex Policy Manager Training – American Dynamics ADSWPMTC

12. Professional Services Certification – American Dynamics Pro Serv Cert

13. Keyboard Controller – American Dynamics line of keyboard controllers compatible with American Dynamics line of matrix switchers.

14. Matrix Switcher – American Dynamics line of matrix switchers and accessories.

15. LCD color monitor – American Dynamics ADMNM1LCD17

16. LCD monitor rack mount kit – American Dynamics ADMNLCDRKMNT

17. Multiplexer – Pelco MX4016 CD

18. Coax cable – WestPenn 25815

19. BNC connectors – WestPenn CN-BM73-30

20. PTZ dome low voltage cable - WestPenn 25227B

21. Fixed camera low voltage cable – WestPenn 25225B

22. PTZ dome control cable – Belden 88442

23. Matrix Switcher Keyboard cable – Belden 88102

24. Cable - General Cable Gen *Speed* 6000 Cat 6 CMP (Plenum)

25. Miscellaneous Connectors – as required. All faceplates shall be electrical ivory.

26. Video cabinet – Middle Atlantic WRK series with accessories as required.

27. Pan/Tilt/Zoom dome camera Housing (outdoor) – American Dynamics ADSDUHOC with associated American Dynamics mount required to install the camera and housing.

28. Fixed camera mounts – Entire line of Bosch mounts and adapters for use with the VDN-498V03-21 cameras.

29. Uninterruptible Power Supply (UPS) – APC

30. RF Distribution Amplifier – Pelco DA104DT

31. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. Furnish all conduit, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.

C. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro. All cables shall be numbered for identification.

D. Splices of conductors in underground pull boxes are not permitted.

E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

G. The system must meet all local and other prevailing codes.

H. All cabling installations shall be performed by qualified technicians.

I. All cabling shall up to 1,000’ be splice free. Any cable requiring field splices must be secured in a lockable NEMA4 (indoor), or NEMA 3 (outdoor) enclosure.

J. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.

K. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.

L. Under no circumstance are "channel locks" or other pliers to be used.

M. All cable shall be run in conduit.

N. All firewalls penetrated by security cabling shall be sealed by use a non-permanent fire blanket or other method in compliance with the current edition of National Fire Protection Association (NFPA) and the National Electric Code (NEC) or other prevailing code and must be a system listed by Underwriter’s Laboratory (U.L.). The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, raceways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.

O. Equipment racks shall be bolted to the floor by the contractor once the Owner determines the exact location for each rack. The earthquake mounting brackets that come with each relay rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the racks final location – the need to unbolt racking equipment to access or service equipment is not acceptable.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

A. The installer shall, upon completion of the system installation, adjust all controls, etc., to provide a system operating at maximum capability.

B. Submit block diagram and shop drawing of equipment.

C. The system shall be programmed to annunciate, in alphanumeric format, the device type and device location (in room name format) for all alarm, trouble, service, and faulted conditions.

3.3 GENERAL TESTING REQUIREMENTS

A. Provide all instruments for testing and demonstrating in the presence of the Owners Representative that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.

3.4 SPECIFIC SYSTEM TESTING AND VERIFICATION REQUIREMENTS

A. System shall be complete and properly operating prior to calling for the test. The Owner’s Representative and contractor and engineer shall walk test system at Owner’s convenience, and

contractor shall make minor satisfactory adjustments to the system in the presence of the Owner's Representative. Contractor shall coordinate the time of test with the Owner's Representative. This test shall be performed during a time when there are no other persons on the site.

B. Tests:

1. Notify Owner's Representative in writing, in advance of testing, at least ten (10) working days in advance of testing to prevent delays in construction schedules.

2. Test all systems and place in proper and specified working order prior to demonstration of the system.

3. Test system grounds to demonstrate that the ground resistance does not exceed the requirements of the Transient Voltage Surge Suppression (TVSS) or the National Electric Codes (NEC).

4. Perform tests as required by authorities having jurisdiction over the site.

5. Testing shall be in the presence of the Owner's Representative, contractor, architect, construction manager and representatives of the authorities having jurisdiction.

C. Verification of Performance:

1. Prior to acceptance of the of the system installation, the security system integrator/installer shall demonstrate to the owner, contractor, architect, construction manager, and representatives of the authorities having jurisdiction, all subsystems, features and functions of the system, and shall instruct the owner in the proper operation and event sequences of the system.

2. Test each system and subsystem. The demonstration is to consist of not less than the following:

   a. Designate actual location of each component of a system or subsystem and demonstrate its function and its relationship to other components within the system
   b. Test the system and subsystems operations by actual Start-Stop/On-Off, Open/Closing, Arming/Disarming cycling, showing how to work controls, how to reset devices and how to conduct emergency operating/operations procedures.
   c. Test communication, signaling and intrusion detection equipment/devices by actual operation of such devices.

3. Systems to be tested are to include, but are not limited to the following:

   a. UPS or battery power and distribution system for standby operation during primary power failure
   b. Security intrusion detection system
   c. Security access control system
   d. Security CCTV system.

4. Furnish the necessary trained personnel to perform the testing and provide instructions. Allow 1 week of time for performing the prescribed testing.

5. Arrange with the owners designated representative the date and times for performing the testing. The owner will select date and time for demonstration and test.

6. The contractor and a factory-trained technical representative shall test the completed system for proper operation. Testing of major equipment shall be done in accordance with manufacturer's instructions and the contractor's documented, and approved testing procedures. All equipment and power shall be operated and checked to ensure that operation conforms to the contractor's elementary diagrams, wiring diagrams, and specifications. The system shall be demonstrated to perform all the functions specified. Any system, equipment or wiring failures discovered during this test shall be repaired or replaced before scheduling the final test. All failures discovered during this test shall be reported to the construction manager/architect in writing. The report shall state the reason for the failure and the corrective action taken.

7. The system shall be tested for final acceptance in the presence of the construction manager's and owner's representative, architect's representative and contractor's representative. The contractor shall record and submit the test results to the construction manager and owner's representatives.

8. Upon successful completion of all final tests and before formal system acceptance, the contractor's representative and security system integrator/installer shall each author and sign a letter confirming the successful completion of the testing. Two (2) copies of each letter shall be forwarded to the Owners Representative.

9. Test equipment: Provide two portable radio transceivers to be used when walk testing the security detection system. The transceivers shall be capable of communication throughout the entire site.

3.5 FINAL ACCEPTANCE

A. The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.

B. The Owner or Owner's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the owner.

C. Two copies of all certification data and drawings for all identifications shall be provided to the Owner before the owner's review.

D. The Owner or Owner's representative will review the installation and certification data prior to the system acceptance.

E. The Owner or Owner's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the Owner reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the contractor.

F. In the event that repairs or adjustments are necessary, the contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.

G. The contractor shall provide not less than three (3) hours for site instruction of personnel in the operation and maintenance of the installed systems. This instruction time shall be divided as directed by the Owner.

H. The contractor shall hand to the owner a copy of any applicable installation specific software configurations in disk format.

I. The contractor shall provide formal Owner training at the new facility consisting of a one (1) hour class for 15 people. The training shall cover use of security and alarm systems including such items as; alarm zone arming/de-arming, false alarm response procedures, programming, and local alarm sounder silencing.

END OF SECTION